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A BRIEF STUDY OF THE RHUBARBS AND A PROBABLE ADULTERANT.

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Pharmacopœia.

Problem twelve proposed by the Committee on Revision of the Pharmacopœia for 1900 reads: "Rheum—distinguish from *Rhaponticum* and from *Rumex hymenosepalus*," the drugs being in the powdered state. The object of this paper is to present the investigations of the author upon the line of work indicated in the query. For the purpose of the study, both microscopical and chemical methods have been employed, and will here be described; and since the greater part of the research has been accomplished by the use of the optical instrument, the methods used and the results obtained by it will first be considered.

In connection with this subject I need only remark that the line of work laid out in former contributions has been adhered to in the present instance. Authentic specimens having been obtained from the Chairman of the Committee, they were carefully prepared, sectioned, and the elements studied in their normal relations to each other. With a thorough knowledge of the structure thus obtained, the drugs in the powdered condition were then observed, and the prominent characteristics noted. Drawings and photographs were made, and appear with this article. It is best, I think, to state here that although the specimens used are doubtless thoroughly representative, care must be used in drawing too general conclusions from the re-

sults obtained on account of the limited number of specimens. For the same reason the paper can be considered merely a preliminary one, subject to such corrections as more detailed study of the subject may indicate. The purpose for which the investigation has been conducted is to discover, if possible, some test whereby the substitution of inferior grades of rhubarb for the better one, or admixture with a foreign drug, may be detected.

A study of the true *Rheum* shows that it is characterized by several features peculiarly its own. Yet despite this there is no exact information, so far as I know, concerning the true botanical origin of the drug. It is commonly ascribed to *R. officinale* and *R. palmatum*, and there is little doubt that one or both of these contribute the major portion of the commercial rhubarb. If but one be the source, then which it is, I think, cannot be said to a certainty.

Rheum officinale is, perhaps, the one usually considered as furnishing the true rhubarb. It is a native of Southeastern Thibet and possibly of China also. In appearance it considerably resembles the ordinary garden rhubarb, with which it has been cultivated in Europe, but differs from it in several particulars. *R. palmatum* is indigenous to Northwestern China. It first became known to Europeans in 1750, and received a description from Linnæus in 1762. Like *R. officinale* it has been cultivated in foreign countries, the first having been grown in England in 1765.

Rheum rhaponticum, European rhubarb, is the source of the cheap variety of rhubarb. It is a native of Southern Siberia, and is closely related to *R. undulatum*, the common garden variety. Like that, too, it is easily cultivated, and the commercial source of the drug is the gardens of Europe.

These various kinds of rhubarb, although comparatively recent additions to the materia medica of the Occident, have long been known and used by the Chinese. Specific mention of the drug is found in their writings as far back as 2700 B.C. They still collect and prepare it as they did in the early days, and Chinese rhubarb is the synonym for the best quality of the commercial article.

Rumex hymenosepalus is a member of the same natural order as *Rheum*, but is a native of the western hemisphere. It has recently come into prominence because of the use to which its tannic acid has been applied. Since this article has to do chiefly with the rhubarbs, no further treatment will be accorded the canaigre. Those

interested in the subject, however, will find a good account of the plant in Professor Trimble's work on the tannins.

The samples of Chinese rhubarb used in the present examination presented the usual fusiform outline and mottled surface. On close examination this latter effect is observed to be due to alterations of a dirty white and a brownish-yellow tissue, and in these colors is particularly observable in fresh fractures or cuts. If such a surface be moistened, though, the white is observed to turn a light, bright yellow, and the former yellow to a striking dull orange color, thus darkening the whole effect. Somewhat the same thing happens by exposure to the air. An observation of a freshly-cut and moistened surface shows that the tissues in numerous places are aggregated into contorted groups, to which effect the mottled or marbled appearance is due. Thin sections show that the lighter ground-work tissue is composed of thin-walled parenchyma cells, while the dark and contorted areas are principally fibro-vascular tissue. The latter, in certain forms of the drug, is regularly arranged into spots having a radiate structure and forming the so-called stellate spots or "Masern" of the Germans. Recent writers state that these are particularly characteristic of the Russian variety, which is no longer on the market. The accompanying drawing (*Fig. 4*), adapted from Berg, illustrates the effect.

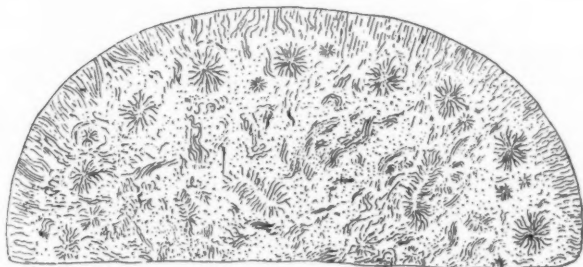


FIG. 4.—Cross-section of Rheum, after Berg.

This peculiar structure is due to the method of growth, whereby the numerous rudimentary leaves on the surface of the rhizome leave the form of their fibro-vascular growth as a permanent record on the parent stem. In the specimens examined this structure did not make its appearance, and I think it will be found that, in its typical form, it rarely does. What really was found was a massed

irregularity of the fibro-vascular tissue in certain areas, as shown in the half-tone reproduction of a photomicrograph (*Frontispiece, Fig. 2*). This doubtless corresponds to the stellate structures of the Russian, but it is not carried out to the same extent.

The *Rhaponticum* (*Frontispiece, Fig. 3*) in the particular just mentioned, presents an entirely different aspect, as is easily distinguished from either variety of the Chinese rhubarb. There is a distinct and plainly-marked radiate structure, unbroken by such an arrangement of the vascular tissue as is so apparent in the true rhubarb. As will also be observed, the paring of the rhizome did not extend down to the cambium line, which appears as a dark line in the figure. The parenchyma here is also thin-walled.

Under higher magnification, the cell contents of the tissues become manifest. In both the *Rheum officinale* and the *rhaponticum* the elements observed are starch grains and calcium oxalate crystals. Of these more extended mention will be made when the powdered form of the substances is considered. *Rumex hymenosepalus* in the gross and in section offers no points of comparison to the species of *Rheum*. The roughly-wrinkled root is of a dark, krameria-red color, and possesses no trace of the characteristic rhubarb odor. The taste is sharply astringent, and in no wise mucilaginous and disagreeable like *Rheum*. The gritty feeling when ground between the teeth is also absent. In section (*Frontispiece, Fig. 1*) it presents the typical form of a simple root. The thin-walled parenchyma occupying the whole extent of the section is marked off into two areas by the concentric cambium line, in such a manner that the inner central one occupies about two-thirds the diameter of the section. Radiating from the center to the cambium line are about twelve groups of tracheary vessels.

In the form of powders the *Rheums* and the canaigre are not easily differentiated, yet a careful examination will not fail to show the presence of the latter, even when mixed with other drugs. The distinction of *R. officinale* and *R. rhaponticum*, however, is a different matter, and the author was not able to select any salient microscopical feature that would serve to distinguish them apart, either individually or in mixtures. But a chemical test was found, which will be described later on.

In a No. 60 powder of either rhubarb the most striking elements observed are the starch grains and calcium oxalate crystals, to

which a more careful study adds the fragments of pitted vessels, and crystals of chrysophanic acid. The cell walls of the parenchyma hardly appear at all, and when present are mere fragments. These common elements offer little means for basing a distinction between the two *Rheums*, since in size and form they differ so little. The only distinction observed was the greater number of starch grains in the *rhaponticum*; but this could hardly be used as point of distinction, since it is such a variable character. Numerous measurements of starch grains and the calcium oxalate crystals were made and gave the following averages: Starch, Chinese, $\cdot 02646$ mm. (Fig.

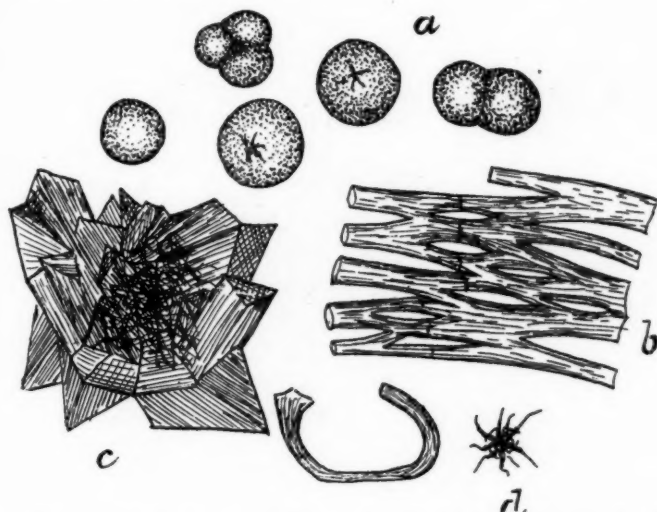


FIG. 5.—Chinese Rhubarb. $\times 450$ diameters. *a*, starch; *b*, fragments of pitted vessel; *c*, calcium oxalate; *d*, chrysophanic acid.

5); *rhaponticum*, $\cdot 0216$ mm. (Fig. 6); Calcium oxalate crystals, Chinese, $\cdot 0716$ mm.; *rhaponticum*, $\cdot 0683$ mm. Both elements are thus seen to be larger in the Chinese form, but the difference is not such a one as could be used as a test.

The powder of *Rumex hymenosepalus* is marked particularly by the size and form of the starch grains (Fig. 7). These are long and slender in form, and exhibit a long, branching hylum, which extends throughout the major portion of the long diameter. The presence of these in a sample of rhubarb powder would at once show that it was adulterated with canaigre, since they differ entirely in form and

size from the *Rheum* starch. A No. 60 powder of this substance also exhibits a much larger proportion of the parenchyma *débris*, the cells of which are much larger than those of the *Rheums*.

The distinction between the two forms of rhubarb that could not be made out by the use of the microscope appeared very distinctly under the influence of chemical reagents. Normally, the two powders differ materially in their appearance. For instance, the Chinese gives a fine, soft powder of a distinctly pure yellow color, and with the odor that is so characteristically that of rhubarb; while the *rhaponticum* affords a granular, pinkish-yellow powder, the odor of which is not so strongly rhubarb-like, but is more woody in char-

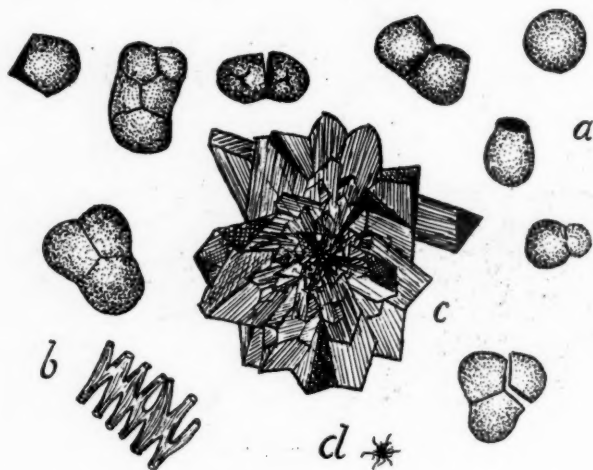


FIG. 6.—*Rheum Rhaponticum*. $\times 450$ diameters. *a*, starch; *b*, fragments of pitted vessel; *c*, calcium oxalate; *d*, chrysophanic acid.

acter. Under the action of alkalis these differences in color become more manifest. Ammonium hydrate proved the most suitable reagent for this purpose. Under its influence Chinese rhubarb turns a dark, brick-red color, while the *rhaponticum* exhibits a distinctly salmon-red shade. Canaigre with the same reagent gives a brownish color. To apply the test, place upon a glass surface a small amount of powder, and moisten it with a drop or two of ordinary ammonia water. At once the color reaction becomes apparent. A mixture of the two rhubarbs cannot thus be detected, as the pink of the *rhaponticum* is masked by the stronger yellow of the Chinese variety. The

stronger alkalis did not afford satisfactory results, since they formed a gelatinous mass with the powders that did not show the colors well.

Briefly, then, the author's results indicate the following facts, viz: That the characteristic elements of the powdered rhubarb are the starch grains, calcium oxalate crystals, and massed acicular crystals of chrysophanic acid, and that these are so similar in the two forms that no point of distinction is offered by them. Also, that the reac-

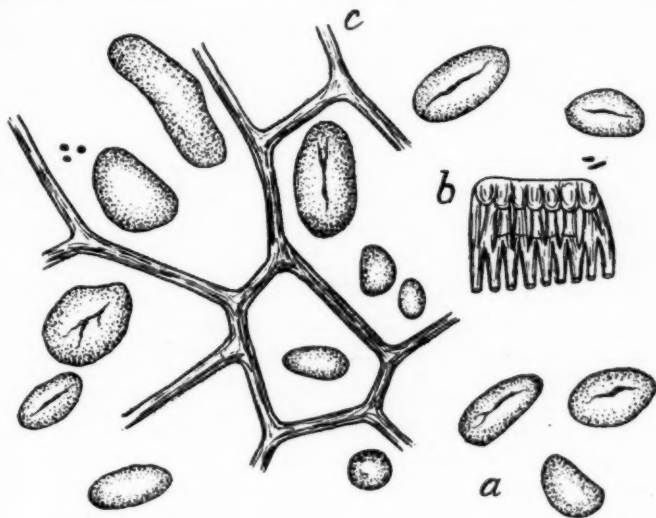


FIG. 7.—*Rumex Hymenosepalus*. x 450 diameters. *a*, starch; *b*, fragments of pitted vessel; *c*, parenchyma cells.

tion to ammonia serves as a means of identifying the pure specimens, but not mixtures. And, finally, that adulteration with canaigre may be detected by the presence of the characteristic long starch grains.

Before making any suggestions as to the manner in which the text of the U.S.P. describing rhubarb may be changed so that powdered rhubarb may be clearly identified, the author desires to make further study of the subject. He would gladly receive the co-operation in this work of any who are interested.

Selenium has recently been employed for producing colored glass. Rose-tinted glass is made by adding selenium directly to the ingredients in the melting-pot, the depth of tint depending on the quantity used and upon the character of the glass—whether hard or soft.

METHOD OF ANALYSIS OF LICORICE MASS.

BY ALFRED MELLOR.

At the December Pharmaceutical Meeting of the College, the question of a method for assaying licorice extract was raised. It was stated that very little on the subject had been published. The following process has been adopted by the large consumers and manufacturers in the United States.

(1) *Moisture*.—Expose about two grammes of the mass in a platinum or porcelain crucible in a water oven until hardened. Then divide the dry residue in small pieces with a penknife, heat again until constant weight.

(2) *Mineral Matter*.—Place the same crucible, with mass as above, over a Bunsen burner until the ashes are white.

(3) *Insoluble Substance*.—Dissolve 5 grammes of the mass in 100 c.c. of distilled water (100° C.) and decant, after twelve hours, the supernatant solution from the sediment through a dried and weighed filter, also collect sediment on same by using cold water in rinsing the beaker. A further sediment is noticed in the filtrate after another twelve hours' subsidence, because traces of starch unavoidably pass through the filter, which is treated as above and collected on a second filter. These two quantities shall be the insoluble substance.

(4) *Gummy Matter*.—Dissolve 5 grammes of the mass in a beaker with 50 c.c. of distilled water (100° C.). When completely dissolved, pour on 100 c.c. of alcohol (95 per cent.), and vigorously stir. Allow to subside over night, filter the precipitate on a dried and weighed filter, and wash the residue with a mixture of two parts alcohol (95 per cent.), and 1 part of water until the filtrate passes colorless. By drying the residue in a water oven and weighing, the combined percentages of insoluble substance and gummy matter are obtained. On deducting the percentage of the insoluble substance (No. 3) from this, the percentage of gummy matter is determined.

(5) *Glycyrrhizin*.—Concentrate the alcoholic filtrate from the foregoing residue (insoluble substance and gummy matter) to the volume of 30 c.c. and transfer to a tared beaker by using about 20 c.c. of water. Add 12 drops of sulphuric acid previously diluted with 5 c.c. of water, while stirring, to precipitate the glycyrr-

rhizin, and set aside over night in a cool place. Pour off the liquid through a filter and wash the glycyrrhizin three times with ice-cold water by decanting. One drop of concentrated ammonia water is added to neutralize any acid remaining. The drying is carried out in a water oven to constant weight.

(6) *Saccharine Matter*.—The liquid decanted from the precipitated glycyrrhizin is neutralized with barium hydrate and the formed barium sulphate separated by filtration. The amount of saccharine matter in the filtrate is determined with Fehling's solution.

(7) *Extractive Substance*.—The balance which remains by addition of the percentages of water, mineral matter, insoluble substance, gummy matter, glycyrrhizin and saccharine matter, and subtracting from 100, will give the amount of extractive substance.

PHILADELPHIA, January, 1898.

DIASTATIC FUNGI AND THEIR UTILIZATION.

BY JOKICHI TAKAMINE.

Up to the present time the germination of cereals has been the only source of diastase of any practical importance known in America and Europe. It is true that there is diastase of animal origin, such as ptyalin and pancreatic diastase, but their sources are limited and their potency unstable. Therefore they are comparatively of less importance than the vegetable diastase, which has an inexhaustible supply of raw materials of uniform power. In Japan, and some other Asiatic countries, certain kinds of fungi are used in the production of diastase. The fungus that is in use in Japan is called *Moyashi*, which was named by Ahlbürg *Eurotium Oryzæ*. It belongs to the genus *Aspergillus*, and is distinguished from ordinary fungus by its remarkable power of generating diastase during its growth. It is a perfectly harmless plant, as proven by the fact that it has been used in Japan for several centuries in the manufacture of the various daily beverages. The accompanying microphotograph shows the form of its beautiful growth. Further study has shown that a good many other fungi have, to a more or less degree, a similar property, and naturally, therefore, the selection of the species which has the strongest diastase generating power becomes of technical importance. This selection is determined by the culture,

multiplication of each species, preparation of diastatic substance and the comparison of the diastatic power of different species under similar conditions. Such selected species are then subjected to cultivation for the purpose of obtaining their matured spores in the production of diastatic substances. For this purpose suitable materials, such as rice, hominy, ground corn, or wheat bran, are thoroughly steamed so as to sterilize the mass, as well as to gelatinize the starch, and the

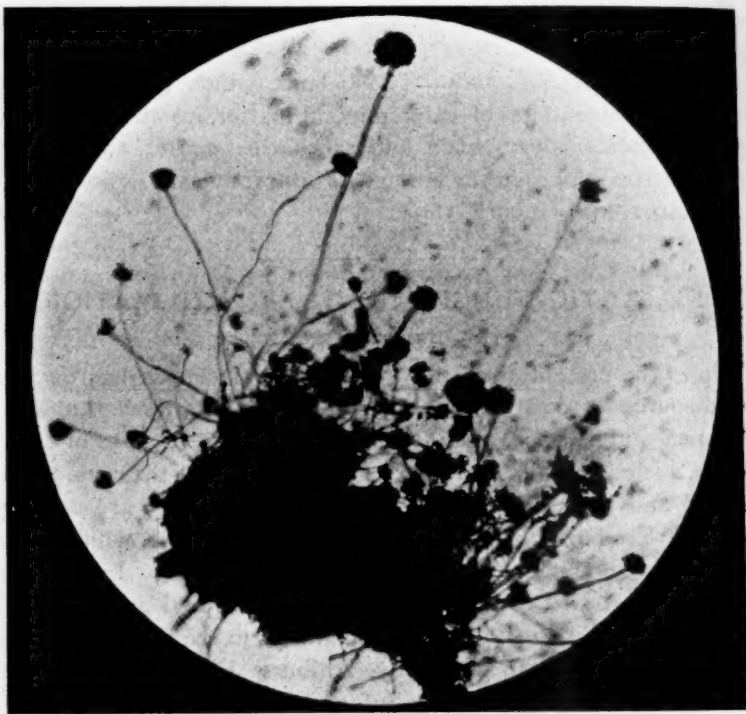


FIG. 1.—Taka-Moyashi.

product is supplied with an artificial fertilizer to give the plant the sufficient amount of nutriment for its complete maturity. On to this mass selected culture is sown, after which it is put into an incubator of proper temperature and humidity. Inside of twenty-four hours the fungus growth will become visible, and at the end of six or seven days the growth will reach its maturity, presenting a rich, velvety appearance of color, varying from reddish to dark green,

according to the species of plant used. This product is carefully dried and preserved. The matured spores of the plant may be separated from the mass by shaking, or sifting, and then can be preserved indefinitely. The product thus obtained is called Taka-Moyashi, and is used as the seed spore in the manufacture of diastatic substances.

To produce diastatic substances for commercial purposes, wheat

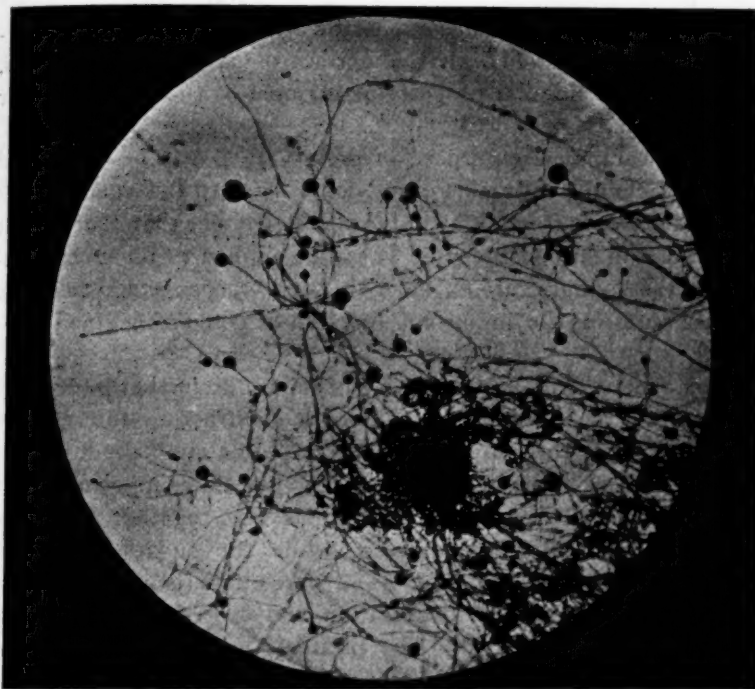


FIG. 2.—Black Fungus—Non-diastatic.

bran is first moistened with water and then thoroughly steamed. After the mass is cooled down below 40°C ., a small quantity of Taka-Moyashi is added and thoroughly mixed. The mass is then taken into a growing-room similar to that of a malt-floor, and spread in a layer varying from one to two inches in thickness. The temperature of the room is kept at about 25°C ., and the humidity at above 80 per cent. Inside of twenty-four hours the fungus shows its growth, and the diastatic strength of the mass will

steadily increase as the growth advances, and it will be found that within from forty to fifty hours the diastatic power reaches its maximum, after which the mass is taken out of the growing room and cooled down to ordinary temperature to check the further growth of the plant. The mass thus obtained is called Taka-Koji, and can be used as it is in the green state, or it can be dried for preservation. As the diastase generated in Taka-Koji is readily soluble in water, the mass may be percolated with cold water and the extract thus obtained can be used as a diastatic agent, or, for the same purpose, it may be mixed with the extract of ungerminated cereals, which have the singular property of augmenting the diastatic power of Taka-Koji.

This extract, for the purpose of preservation, may be evaporated under a vacuum to a thick, syrupy condition. In this condition its diastatic power is from eight to ten times stronger than that of malt extract of similar consistency. It can be applied to all such industries as the manufacture of alcohol, beer, vinegar, etc., where the diastase performs the important function of converting starch into sugars.

The aqueous extract of Taka-Koji can still be further purified by precipitating the diastatic principle of the extract by the addition of alcohol. For this purpose an extract containing about 20 per cent. of solid matter is mixed with four to five times its own volume of strong alcohol. By this means the diastase, together with some other albuminoids, is precipitated, while the sugars and other impurities remain in solution. The precipitate is now separated from the mother liquor by decantation and centrifugal force; it is then pressed and air-dried. The product thus obtained is called Taka-Diastase. It is a yellowish-white odorless powder, possessing a nutty taste. It is readily soluble in water, yet it is non-hygroscopic. It is perfectly stable in its diastatic power. It converts in ten minutes over 100 times its own weight of starch, according to the modified Junk's test. It has remarkable starch-liquifying property besides starch-saccharifying property, the former being three or four times stronger than that of purified malt. It is strong enough for all practical purposes. It can be, however, further purified to wonderful strength by re-precipitation or otherwise.

The applications of Taka-Diastase are varied and extensive. From the remarkable stability of its diastatic power it can be used

as a standard of comparison in the determination of the diastatic power of other substances. Its use as a remedy for amylaceous dyspepsia is of no mean importance.

Considering the fact that more than two-thirds of our food consists of starch substances, such as potato, bread, pudding, etc., and also that the diastase of the saliva has to perform the principal function in the digestion of starchy food, and that the saliva is subjected to various causes of loss and deterioration of its diastatic power from various causes, such as smoking, drinking, chewing and rapid eating, it is not to be wondered at that two-thirds of the dyspepsia is of a starchy origin, and therefore it is apparent that some kind of strong diastatic substance is required to supply the deficiency of the diastatic power in the system of the digestive organs.

While our knowledge is very limited of the quantitative estimation of the diastase daily generated, and contained in the saliva and pancreatic juices, as far as my investigation goes the quantity of diastase secreted in the saliva daily is very considerable. It amounts to from 5 to 8 grammes of Taka-Diastase, or about $\frac{1}{2}$ pound of the best malt extract. While investigation in the way of the production of diastase from a fungus growth is still in its infancy, yet that which we already know on this subject seems to indicate that this has opened an entirely new field for the economic production of diastatic ferments. I firmly believe that this field will, in the future, supersede in every respect the old known source, namely, the germination of cereals.

A SIMPLE AND ACCURATE METHOD OF TESTING DIASTATIC SUBSTANCES.

BY JOKICHI TAKAMINE.

There are various methods known for determining the diastatic power of substances, as Lintner's, Junk's, and others. While some of these are very reliable in many respects they are complicated, and require specially trained hands to get reliable results. They are not, therefore, applicable when quick, simple and accurate testing is desired, as in diagnosing a certain form of amylolytic dyspepsia by determining the diastatic power of the patient's saliva. My pro-

posed test method is based upon the stable diastatic property of Taka-Diastase.

So far as is generally known, and it is also my own experience, that the diastase isolated from malt, and that precipitated principle of saliva known as ptyaline, lose their diastatic power by standing. Therefore, when the diastatic power of any substance is to be determined, it is necessary, if they are used, to go through the long process each time of determining the quantity of sugars formed by their action on starch (Lintner's method), or else measure the length of time required to convert the given quantity of starch into sugar. (Junk's method). While these processes have valuable merits of their own, yet they have the disadvantage of being rather complicated for quick, everyday work. In carrying out my proposed method, a quantity of Taka-Diastase is tested by either of the above-mentioned processes (Lintner's or Junk's¹), and its exact diastatic power determined once for all. The diastatic power may be expressed as, say, 300 Lintner's units, or it may be expressed as converting 100 times its own weight of dry starch into sugar in ten minutes.

The diastatic power of any substance under examination is now compared with the standardized sample, and expressed in any terms desired, either directly or by simple calculation. It is highly desirable that one standard should be adopted, and, whatever that may be, the following comparative test will be found useful. First prepare the following solutions:

(1) *Standard Taka-Diastase Solution.*—Dissolve 1 gramme of standardized Taka-Diastase solution in 100 c.c. of water; this solution ought to be made fresh each day.

(2) *Starch Solution.*—Make a 5 per cent. solution of neutral potato starch by boiling 800 c.c. of distilled water in a suitable wide mouth vessel; pour into it milk of starch, made by stirring 50 grammes of starch into 200 c.c. of cold water, and boil two minutes.

(3) *Iodine Solution.*—Place 1 gramme of iodine and 2 grammes of potassium iodide in a flask, add a little water, say 5 c.c., agitate until dissolved and dilute to 120 c.c.; or dilute 50 c.c. tincture of iodine, U.S.P., with 50 c.c. of water, containing 2.5 grammes of potassium iodide.

Apparatus Required.—(1) One quart agate-ware kettle; (2) one

¹ Lintner, *Jour. für prak. Chem.*, [2] 34, 378-394. Junk, *Am. Jour. Phar.*, 55, 289 and 57, 13; modified in *Bulletin of Pharmacy*, February, 1898, page 52.

shallow tin pan, 2 inches deep, 8 inches in diameter; (3) two 1 c.c. pipettes graduated to tenths; (4) eight large glasses or tumblers of about 150 c.c. capacity each; (5) ten small test tubes; (6) one 100 c.c. cylinder; (7) two white dinner plates.

Process of Testing.—Pour into each of the eight glasses 100 c.c. of the hot starch paste. Place them side by side in the shallow pan of warm water at about 40° C. Measure into the first glass 1 c.c. of the saliva or other liquid to be tested. Pour, of the standard diastase solution, in quick succession:

Into the second glass	1 c.c.
Into the third glass	2 c.c.
Into the fourth glass	3 c.c.
Into the fifth glass	4 c.c.
Into the sixth glass	5 c.c.
Into the seventh glass	6 c.c.
Into the eighth glass	7 c.c.

Then the contents of each glass is stirred with the test tube as a stirring rod in quick succession, until the starch paste all becomes limpid. At this stage it will be observed that the stronger the diastatic power the quicker the liquefaction of the paste. When the contents of the glasses become liquefied, take out of each glass in succession a drop of the liquid by means of the stirring test tube, and drop on a white, dry dinner plate in the order of the glasses. When there are eight drops of equal size on the plate, drop on each one drop of the iodine solution. Then spread each sample with the finger to about the size of a silver dollar. The drops from the second to the eighth glass will form a colorimetric scale from blue to purple and reddish-brown. Observe now which member of the scale corresponds to the color of the one containing the saliva. The comparison is made more certain by repeating the tests within the first ten minutes after the saliva is put in.

Suppose the color corresponds to somewhere between the fourth and fifth, then we can assume it at 4.5, and calculate the diastatic strength in terms of starch converted or sugar formed; or, if further accuracy of the test is desired, a scale of starch glasses containing standard diastase solution of 4 c.c., 4.2 c.c., 4.4 c.c., 4.6 c.c., 4.8 c.c., and 5 c.c., may be put up and compared with 1 c.c. of the given saliva in the same manner.

Instead of having only one specimen at a time, several samples of saliva or other diastatic substances can be tested at once.

ASARUM CANADENSE, L.¹

BY HENRY KRAEMER.

The work of the Systematist, with both Phænogamous and Cryptogamous plants, is affecting all departments of Botany, and therefore also the pharmacist and physician who have to deal with their healing properties. When we consider that the chemist has made several hundred new remedial compounds or preparations, we may expect that the botanist will also add, to some extent, to our materia medica. The chemist can apparently easily enough add to or take away from a compound a radical or radicals, or rearrange the whole and obtain something that is very different from what he started, and to which he may give a new name. But the botanist is dealing with things that possess a vital force—and, consequently, is at a disadvantage, very frequently, to say, without long and careful researches, whether he has something new or not. If he goes to an unexplored realm, he expects to find undescribed plants. Some, however, prove to be merely forms, others are distinct species. This latter distinction, however, it must be said, cannot have been proven until from the seed similar forms of plants are produced.

In more recent years the familiar plants around us have become more carefully studied. Students are studying them as they occur in the field from year to year. All are beginning to recognize that each individual shows some characteristics of its parents, but that, under peculiarities of environment, they manifest a tendency to variation. It is not surprising, therefore, that forms occur that seem quite distinct from the parent. Whether they are so can only be proven by observing the development from the seed to seed. If this apparent dissimilarity continues in the offspring as an inherent and hereditary quality, then we have, by reason of the law of variation, first a variety, and finally a distinct species. Until such tests have been made, it seems that a new species has not been proven to exist. What the various reactions and combustions are to the chemist, this life history, as perpetuated in the plant from the parent to the seed and subsequent offspring, is to the scientific, systematic botanist.

¹ Thanks are due the editor of the *Torrey Botanical Club Bulletin* for the loan of electrotypes of Eugene P. Bicknell's paper in the November, 1897, issue of that journal.

Everyone who has had anything to do with the study of plants in their environment has observed remarkable differences in them depending upon the conditions of soil (both physical and chemical), atmosphere, light, etc.; and when the plants are removed from these conditions and placed under similar influences to a similar degree, that these differences not infrequently disappear, and we

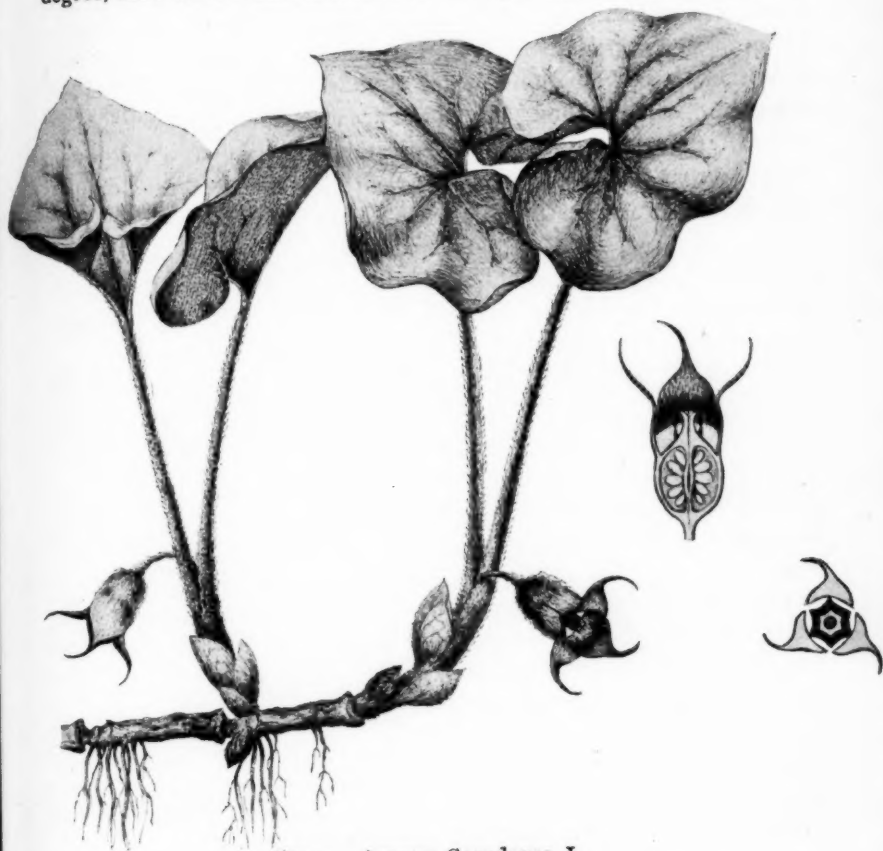


FIG. 1.—*Asarum Canadense*, L.

have become better acquainted with the origin of the forms so different.

The discovery of an additional species, in an old species of medicinal plants, has been made recently by Eugene P. Bicknell. In an article¹ on "A new species of wild ginger hitherto confounded with

¹ *Bulletin of the Torrey Botanical Club*, November, 1897, p. 528.

Asarum Canadense, L." he says: "It has certainly much significance in its bearings on the study of our common flora that a plant so noteworthy as the familiar wild ginger, and supposedly so well understood, should now reveal itself as embracing two perfectly distinct species. Both plants are common and widely distributed, but they are so much alike in general appearance that it is scarcely a matter of surprise that they have held their secret so long. Agreeing in main features throughout, they share the same general form of rootstock, leaf and flower, are similar in habit of growth, and bloom at the same time. The differences between them are, in fact, no greater than might fairly measure the variation of a single species, and that they are of higher import has been learned only by careful field-study continued through several seasons. While the determination of dried specimens is not always easy, living plants may always be distinguished instantly by a glance at the flowers, and further comparative study cannot fail to lead to their recognition as beautifully similar, yet beautifully distinct species."

"The most obvious differences between these plants reside in the flowers. In the one, the calyx-lobes are spreading and revolute, passing gradually into a slender, upcurved acumination, and the interior of the tube is purple nearly down to the base; in the other species the calyx-tube is white within and the flat and reflexed lobes are abruptly acuminate at the apex into a straight obtuse point."

The new species Mr. Bicknell calls *A. reflexum*, and in order to readily see the distinction between this and *A. Canadense*, I have arranged the elements of the two, with their characteristics, as given by Mr. Bicknell in the following manner:

Asarum Canadense, L.

(1) Roots numerous, mostly clustered at the lower ends of the internodes, often densely matted together.

(2) Rootstock short, stout, 2.5-15 cm. long, 6-10 mm. thick.

(3) Internodes 1.5-4.0 cm. long, puberulent, narrowly scarred from the insertion of the pollen bracts.

(4) Constricted at the nodes.

Asarum reflexum (n. sp. Bicknell).

(1) Roots fewer and more slender than in *Canadense*, more scattered, or borne mainly at the forward ends of the internodes.

(2) Rootstock slender and elongated, 1.0-4.5 dm. long, about 4 mm. thick.

(3) Internodes 4-10 cm. long, glabrous, bract scars prominent, the uppermost distant.

(4) Little, if at all, constricted at the joints.

(5) Bracts broadly ovate, obtuse, more or less puberulent, approximate or overlapping, finally loosely spreading and deciduous.

(6) Leaves, commonly reniform-cordate, little, if at all, broader than long, with a deep, often partly closed sinus, acute or obtuse at the apex, rugose veiny, the hirsutulous-puberulent upper surface with a satiny lustre, the lower surface somewhat shining beneath the close pubescence of minute white hairs.

(7) Leaves at first 4-7 cm. broad on petioles, 2.5-5 cm. long, later becoming much larger, and reaching an extreme size of 21 cm. wide by 19 cm. long, on petioles 32 cm. in length.

(8) Petioles 3-6 mm. thick, at first canescent throughout, or densely white pubescent, with short, spreading, or slightly reflexed hairs, becoming more loosely pubescent or puberulent, often with cinereous or somewhat rusty hairs.

(9) Flowers at anthesis usually reclining on the ground on short, spreading or declined peduncles, at maturity often erect or raised on ascending or erect peduncles 13-40 mm. long.

(10) Freshly opened flower about 1.3 cm. long, the tube of the calyx about twice the length of the ovary, when fully grown, often 2.5 cm. long and 12-15 mm. wide, the ovary and tube of about equal length.

(11) Upper half of the erect calyx-lobes spreading or ascending, somewhat crescentic in outline, with revolute margins which pass into an upcurved tubular acumination 4-8 mm. long; spread of the flowers across the acuminate lobes 2-3.8 cm., the opening of the tube circular.

(5) Bracts narrower and more acute than in *Canadense*, less pubescent, more or less separated or distant, early spreading and deciduous.

(6) Leaves varying from reniform and lunate-reniform, with a shallow open sinus to suborticular with a deep sinus obtusely pointed, broadly acute or rounded at the apex, darker green, thinner and less rugose than in *Canadense*, commonly nearly glabrous above and with a satiny lustre, somewhat shining on the lower surface through the thin or sometimes close pubescence of minute hairs.

(7) Leaves commonly 10 cm. wide by 8 cm. or less long, on petioles 1.5 dm. long, an extreme size, 1.7 dm. wide, on petioles 2 dm. long; at vernalion the petioles are relatively longer than in *Canadense*.

(8) Petioles slender, 3-4 mm. thick, loosely or thinly tortuose-pubescent, with slightly longer and softer hairs than in *Canadense*, somewhat shining on the outer surface, and mostly glabrous towards base, except along the villous-pubescent inner margins, often nearly glabrous throughout in age.

(9) Flowers at anthesis on slender ascending or erect peduncles, at maturity mostly spreading or reclined on peduncles 3-5 cm. long.

(10) Flowers smaller than those of *Canadense*, 8-20 mm. long, 7-14 mm. wide, spreading 16-26 mm. across the extended lobes, the tube 4-8 mm. high; the ovary from the first about the length of the calyx-tube.

(11) The limb early reflexed, in age sometimes ascending, the lobes 8-10 mm. long, about the length of the tube, flattish and rather brittle, triangular in outline, ending abruptly in a straight obtuse point 2-4 mm. long; opening of the flower commonly more or less triangular.

(12) Rudimentary petals almost always present as filiform bodies 2-4 mm. long, rising from the surface of the ovary opposite the sinuses of the calyx.

(13) Peduncles and calyx villous-pubescent or in age nearly canescent, the spreading purple segments densely erect—puberulent with thickish purple hairs, or sometimes greenish and nearly glabrous, probably through abrasion; inflexed tips of the calyx-lobes in the bud coherent and extending down to the tip of the column; exterior of the calyx hexagonal, the six faces plane, dull whitish to greenish purple, the interior of the tube deep purple more than half-way down to the white base, which surrounds a hexagonal purple band enclosing the stamens.

(14) Surface of ovary at maturity somewhat pyramidal, rising into the short, thick terete column, which is 2-4 mm. high and rather deeply six-lobed at the summit; stigmas prominent, at anthesis pale-pink and densely spiculate.

(15) Stamens dull pinkish-purple, anthers dull pink; prolonged tips of the filaments slender-subulate, from one to three times the length of the anther in the long series of stamens. (*Fig. 1.*)

(16) Habitat: From Quebec and Ontario to Western Massachusetts, Southeastern New York and Pennsylvania and southward in the Alleghanies to Virginia. In rich, hilly woods, often in rocky situations.

(12) Rudimentary petals usually wanting.

(13) Peduncle and calyx densely cottony-villose, much less so in age, the outer surface of the sepals loosely pilose-pubescent, the reflected brownish purple segments somewhat shining and minutely puberulent, with dull purple hairs and faintly parallel-veined; inflexed tips of the sepals in the mature bud extending only half-way to tip of column; interior of the tube white or greenish-white below the rim, the disk surrounded by a purple band, as in *Canadense*; exterior of flower white to greenish purple, the hexagonal base with prominent rounded angles and intervening depressions.

(14) Surface of ovary plane or nearly so; column slender, columnar, longer than in *Canadense*, 4-7 mm. long, strongly grooved to receive the longer series of stamens, the stigmas greenish and purple, rather smaller than in *Canadense*, and often merely granulose.

(15) Stamens deeper purple than in *Canadense*, with shorter anthers, the filaments slightly longer and closer to the column, their tips shorter and less attenuate, often less than half the length of the anther. (*Fig. 2.*)

(16) Habitat: Southeastern New York, and doubtless Connecticut, to Iowa, south to the mountains of North Carolina, Missouri and Kansas. Rich, low woods along streams or river, valleys, often forming extensive beds; more rarely in upland woods; flowering at the same time as *A. Canadense*.

Mr. Bicknell further says, regarding *A. reflexum*, that "it would appear that a geographical variety must also be recognized. Living specimens were sent to me in May, 1897, collected on the bank of the Desplaines river at Maywood, Ill., near Chicago, which, though essentially like the type, show characters apparently never developed

by the more eastern plant. As in the case of *A. reflexum* and *A. Canadense*, here again the most evident differences are found in the flower, which shows especially a notable elongation of the strongly-

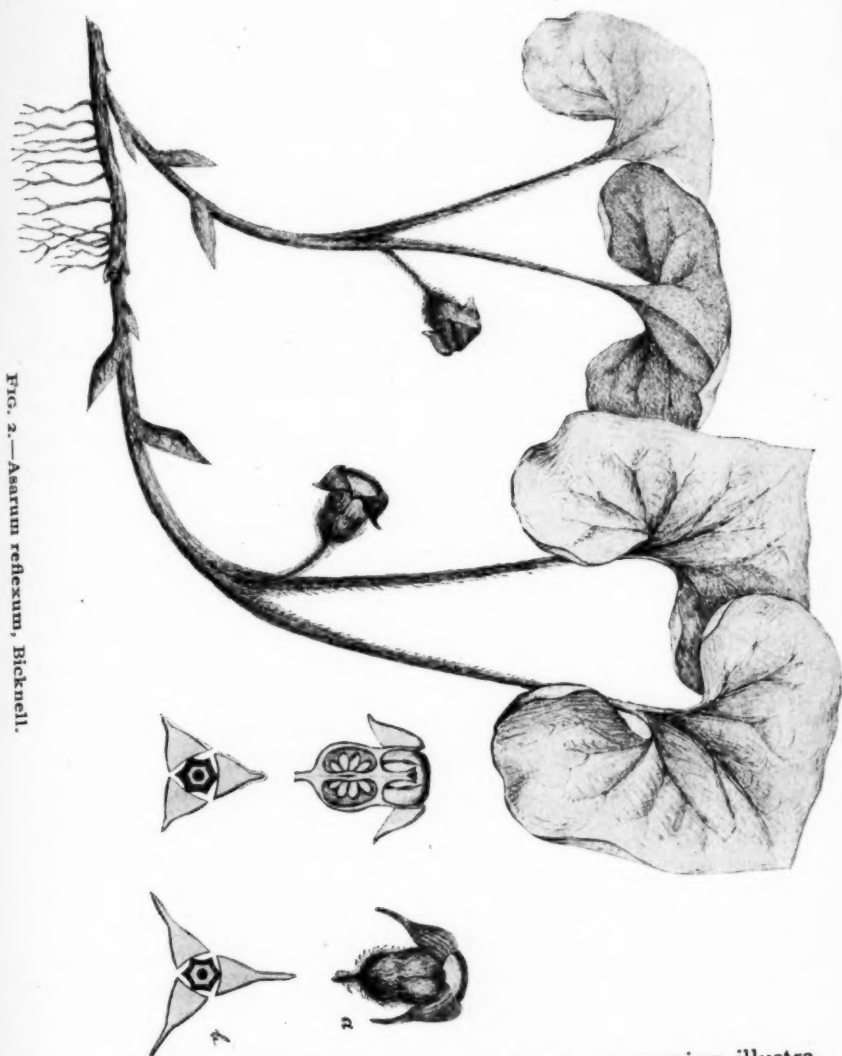


FIG. 2.—*Asarum reflexum*, Bicknell.

reflexed calyx-segments, as denoted in the accompanying illustration (Fig. 2, a, b)."

The late Prof. E. S. Bastin has given the readers of the *Amer. Jour.*

Pharm. (December, 1894, p. 574) a careful description and drawing of the *Asarum Canadense*, L. (Fig. 3), that he studied, together with the inner morphology of the rhizome and roots. The drawing is reproduced at this time on account of the interest attached to Mr. Bicknell's studies. In his description of *A. Canadense*, L., Professor Bastin says, among other things, that the leaves are "broadly reniform, entire-margined and slightly but distinctly pointed at the apex. They attain a transverse diameter of from 10 to 12 cm., are deep-green and silky-lustrous by reason of a minute pubescence on the upper surface, and are lighter colored and prominently veiny below."

"From between the two leaf-bases issues a single pedunculate, nodding, dull-purple flower, which, together with the peduncle, is densely covered on the outside with a woolly pubescence. The calyx is rather fleshy, with its tube adnate to the ovary, and a three-parted limb, the segments of which, in the bud, have their tips inflexed, but which, when the flower is in full bloom, are wholly recurved. The corolla in this, as in all other species of the Aristolochiaceæ, is wanting."

We naturally expect that a plant with such aromatic properties would be described in almost all of the medical botanies. We find in Barton's Botany (p. 87) a colored illustration of what he calls *A. Canadense*. He says: "The calyx is very woolly, and is divided into three broad, concave, acuminate segments, with the point reflexed. They are of a deep-brown purple color on the inside, and of a dull-purple, inclining to blue-green, externally."

Bigelow, in his Medical Botany (Vol. I, p. 151), says: "Calyx—very hairy or woolly, consists of three broad concave leaflets, which are mostly of a brownish or dull-purple on the inside at top and bottom, and terminated by a long, spreading, inflected point, with reflexed sides. The color varies greatly, according to the amount of light which the plant enjoys."

Eaton (Botany of North America, p. 173) describes *Asarum Canadense* to have "the calyx woolly, deeply three-parted; divisions sublanceolate, reflected."

Wood (Class Book of Botany, p. 601) says under *Asarum Canadense*, L., "calyx woolly, deeply 3-cleft, the segm. reflected." * * * "Color purplish, of 3 broad, long-pointed divisions abruptly spreading."

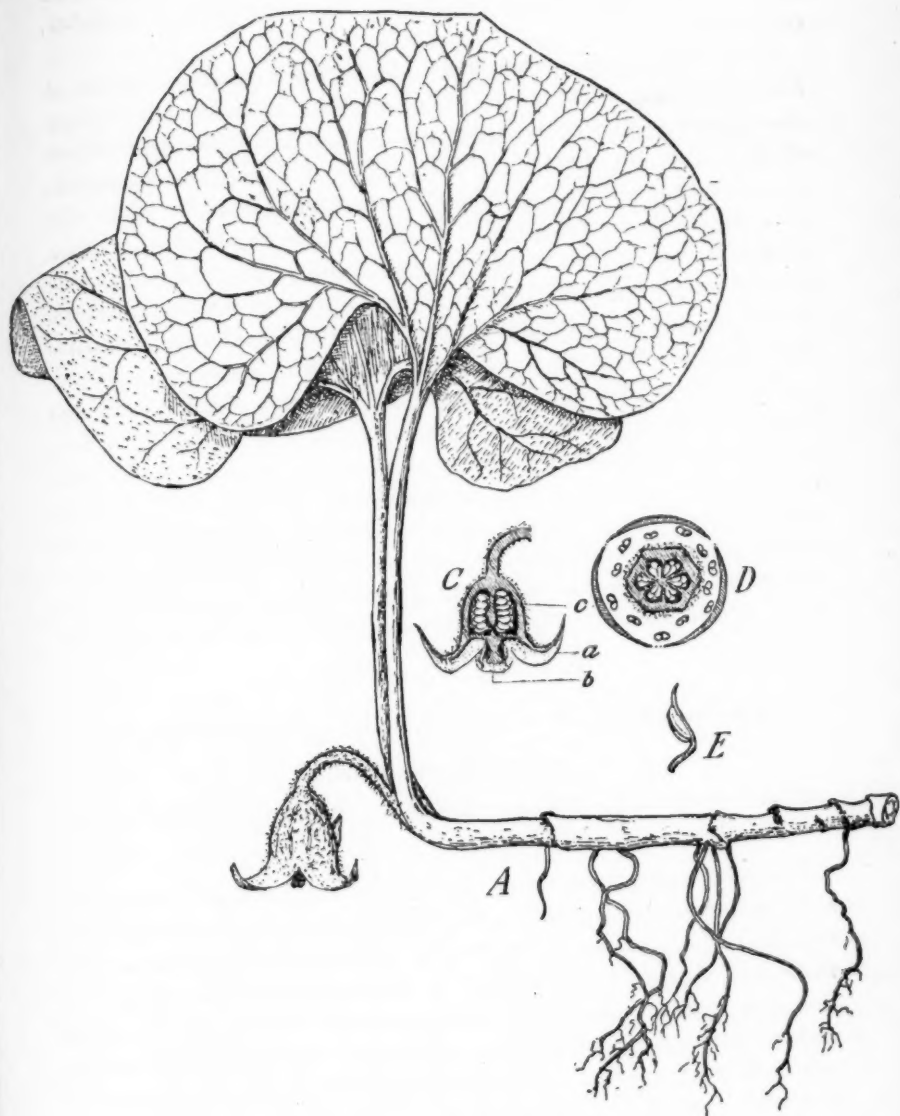


FIG. 3.—*Asarum Canadense*, L.

In Elliott's Botany (vol. I, p. 531) we learn that *A. Canadense*, has the calyx woolly, deeply 3-parted, segments nearly lanceolate, reflected."

From these citations we might be inclined to think that the *A. Canadense* described by writers of medical botany has been really *A. reflexum*. According to Bicknell, "Rafinesque really knew both of our plants, but made the mistake of renaming true *Canadense*, assuming that to be the one which was undescribed." As to what plant yields the "wild ginger" of medicine, whether *A. Canadense*, or *A. reflexum*, and as to whether any change ought to be made in our present nomenclature, further investigations are necessary. According to Britton and Brown (*Flora of Northern United States and Canada*), *A. Canadense*, L., perhaps includes two species.

That the medical and pharmaceutical professions ought to be slow to adopt new names is evidenced by the fact that scientific systematic botany cannot be made until all of the returns are in from the various departments of botany, including inner as well as outer morphology, biology and ecology. Consequently the names by which we have recognized plants ought to be held as the safest means of carrying on the work of the two professions, so that little friction and misunderstanding may occur.

AN EXUDATION FROM LARIX OCCIDENTALIS.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 174.

Resinous exudations from conifers are very common, but there are a few instances where the secretion resembles in physical properties the carbohydrates. One of the most notable of these is that from the *Pinus Lambertiana* or sugar pine of California, and known as pixite. Another exudation is that from *Larix Europæa*, and known as Briançon Manna. Berthelot determined this to consist chiefly of a sugar which he termed melezitose. Recently I received from Prof. C. S. Sargent, of Harvard University, a small specimen of a sweetish substance collected by him from the *Larix occidentalis* on the upper Columbia river in British Columbia. He stated that it is used to some extent as a food by the Indians. It

was of a brownish-yellow color, somewhat porous, and possessed only a moderately sweet taste with a terebinthinous flavor. It was freely soluble in water on warming. The resulting solution was neutral to litmus paper, reduced Fehling's solution, and darkened on heating with sodium hydrate. The product from heating with the latter when supersaturated with nitric acid gave an odor of caramel, which pointed to the presence of some dextrose. On heating a weighed portion of the sample, after solution in water and filtration from the adhering particles of bark, with Fehling's solution, 19.38 per cent. of a reducing sugar were obtained.

Another portion similarly prepared and heated with dilute acid, and then, after making alkaline, with sodium hydrate, treated with Fehling's solution gave a total sugar value of 88.07 per cent., indicating 68.69 per cent. of non-reducing sugar or similar substance.

Treatment of a moderately strong aqueous solution with three or four times its volume of alcohol caused an abundant precipitate, which indicated that the non-reducing portion was precipitated, while the reducing portion remained in solution; the respective weights of these two portions, obtained by alcohol, confirmed the foregoing by Fehling's solution. The following will summarize the composition of the specimen:

	Per Cent.
Reducing sugar	19.38
Non-reducing sugar	68.69
Moisture at 100° C.	5.02
Ash	0.44
Wood fibre, etc., removed by filtration	6.47
	<hr/> 100.00

The reducing sugars had many of the properties of dextrose, but gave only a slight precipitate with phenylhydrazin. The non-reducing portion closely resembled dextrin. There was not enough of the sample to make a complete study of these two substances. I naturally inferred on commencing this investigation that this substance would closely resemble the Briançon Manna and consist of melezitose, but the absence of a very sweet taste and a number of other properties showed it to be entirely different from that substance. The portion soluble in alcohol yielded only traces of an osazone with phenylhydrazin, but the major part of the original substance was not precipitated by that reagent.

TRUE AND FALSE CACTUS GRANDIFLORUS.¹

BY GORDON SHARP, M.D.

EXPLANATORY.

In the end of 1891 my attention was directed to the night-blooming *Cereus*, a so-called heart tonic, the correct botanical name of which is *Cereus grandiflorus*, Miller, although it is commonly known as *Cactus grandiflorus*, Linné. I made several bedside observations with a tincture which has a greenish color. Sometimes I thought I had obtained good results; at other times I had difficulty in deciding whether the preparation had any virtue at all. This, however, is not unusual in treating of disease, especially heart disorders. But between these conflicting opinions I resolved to place the drug on further trial. In time the supply of tincture ran down and another was ordered, but when it came to hand I was astonished to find that, although like the former, it had a pleasant orris-like odor, the color was different, being of a yellowish-brown hue. The pharmacist from whom it was obtained made inquiry, and was told it was quite right, and was the genuine drug, and no further questions were asked. My bedside observations were continued, and sometimes I had a greenish and sometimes a brownish tincture or liquid extract, but oftener the latter. After several further trials I decided to make my own tincture, and with this purpose in view I got a pharmacist to procure me the dried flowering tops, and this he did from a Manchester house. Mr. J. H. Hoseason at this time joined me in investigating the chemistry of the drug, and either jointly or alone we had an agent to obtain supplies from Manchester, Leeds, London, and Edinburgh houses. In one way or other we employed many pounds weight of the drug, and each parcel was certified to be the true *Cactus*. For reasons which will be obvious later on, I have made particular mention of these facts. We had previously searched the literature of the subject from every possible source, but could find no mention of any analysis of the drug. We resolved to start at the beginning, and I think I may be pardoned when I say we expended endless labor in our task. Our results have been partially recorded in the *Practitioner* of September, 1894, and in the *Pharmaceutical Journal* of November 24, 1894. But the chemistry is the

¹ *Pharmaceutical Journal*, December 18, 1897.

chemistry of *Opuntia decumana*, Haworth, not of *Cereus* (*Cactus*) *grandiflorus*, Miller. We owe the unearthing of this blunder to the learned Curator of the Pharmaceutical Society's Museum in London, Mr. E. M. Holmes. Mr. Holmes investigated this subject last summer, and communicated with me, and I sent him a specimen of the drug we had worked with, and at once the fallacy was discovered. He has written an article on the subject of *Cereus* and *Opuntia* in the *Pharmaceutical Journal* of August 21, 1897. The pharmacology of my article in the number of the *Practitioner* already quoted is really the the pharmacology of *Opuntia*, not of *Cereus*.

The question of therapeutical action does not concern a company of pharmacists, but it is almost necessary for me to refer shortly to this aspect of the subject. The therapeutic observations were made from specimens of both *Cereus* and *Opuntia*, and also from pills prepared from the formula of Mr. T. W. Sultan. Each pill contains $\frac{1}{100}$ grain of extract of genuine *Cereus*. Mr. Sultan does not say in his pamphlet whether this preparation is an alkaloid, or a resin, or a glucoside; he merely calls it the active principle. After all, then, my practical results are not much affected, if affected at all, by my pharmacological and botanical blunders. I am not alone in my experience, for I have had sent me from various sources samples of tincture, labelled *Cactus grandiflorus*, but which were preparations of *Opuntia*, and yet medical men had assured the senders that they possessed the virtues ascribed to the genuine drug. Since the publication of my article in the *Practitioner* I have had opportunities of carefully testing genuine *Cereus* alongside *strophanthus* and our old friend foxglove, and I have come to the conclusion that *Cactus*, whether genuine or spurious, is worthless, and should be discarded by both pharmacist and physician. Why should *Opuntia* have been so widely sold for *Cereus*?

From the fact that we obtained spurious specimens from so many sources, we must conclude that *Opuntia* has been widely distributed. On first consideration we are strongly tempted to blame the drug merchants for imposing a spurious drug on the buyer. I do not share this view. I believe the mistake arises largely owing to the carelessness of botanists in often calling *Cereus* by the name *Cactus*. I do not know whether *Opuntia vulgaris*, Miller, is another name for *Opuntia decumana*, Haworth, but I do know that *Opuntia vulgaris* is also known as *Cactus opuntia*, Linné. Here, then, may be

an explanation of the whole difficulty. The generic name *Cactus* having once got afloat, merchants, pharmacists and medical men have concluded there could be but one *Cactus*.

CHEMISTRY OF *CEREUS* AND *OPUNTIA*.

Cereus.—In Mr. Holmes' article in the *JOURNAL*, he tells us that Bonnett and Bay-Tessier discovered an alkaloid which they named cactine. Mr. E. H. Farr examined the drug in quantity, and found, among other substances, "glucosidal resinous bodies," and "also an alkaloid which is present in very small quantities only." The alkaloid must be present in very small proportions, for I failed to get any reaction with Thresh's reagent with three fluid drachms of a one in one extract. I do not like the name "glucosidal resinous bodies," which Mr. Farr employs, and I hardly appreciate the meaning of the term, but I am, perhaps, as worthy of blame myself, for I find that I suggested that resins might play the part of glucosides. Of one thing I am certain, and it is that some resins do reduce weak Fehling's solution when allowed to stand for an hour or less at the temperature of a water-bath. *Cereus* stems contain a large proportion of chlorophyll, and to this the extracts and tinctures of the genuine drug owe their beautiful green color.

Opuntia.—Still referring to Mr. Holmes' essay, Mr. Farr says: "On working on a quantity I did get an indistinct reaction for alkaloids and also a very slight reduction with Fehling's solution." Further, referring to the resins, Mr. Farr adds: "The most characteristic one is but very slightly soluble in aqueous solutions, and gives, with ammonia, a deep-yellow color. This one, with at least two of the other resins, reduces Fehling's solution on boiling, and to a fair extent." The experience of Mr. Farr with regard to the resins of *Opuntia* agrees in many points with that of Mr. Hoseason and myself, but we found no alkaloid, and we worked on large quantities and made a large number of trials. However, a significant point is that Mr. Farr only got an "indistinct reaction for alkaloids." The flowering tops and stems of *Opuntia* contain a pigment which I imagine is xanthophyll, and hence the alcoholic tinctures and extracts of the drug have always a yellowish or light-brownish color.

How came *Cereus* to be employed as a heart tonic? In view of the somewhat dogmatic opinion I have expressed of the worthless-

ness of *Cereus* and *Opuntia*, one must ask how the drugs came to have tonic properties? Before answering this query, we have to pause and ask ourselves how we have acquired our knowledge of many of our most valuable drugs. We civilized races, who have an intimate acquaintance with the sciences upon which is built the rational treatment of disease, have to acknowledge that to savage tribes or unlettered peoples belongs the credit of bringing under our notice the action of valuable drugs. Only to name one—sacred bark. The Spanish settlers of the Pacific Coast employed this agent long before it was known to us, and those Spanish settlers, we can hardly doubt, got their information from the original occupiers of the soil. In like manner, *Cereus grandiflorus* has been long employed by the West India Islanders in dropsy. *Opuntia* is also employed, in the form of a decoction, as a demulcent drink.

Both drugs contain a certain amount of resins and pectin (or a similar agent), and these substances have a stimulant action on the kidneys, and would, of course, be useful in dropsies. Now, many dropsies, if not most, have their origin in heart affections. The transition from the treatment of dropsy to the treatment of heart affections is an easy one. But then these peoples employ decoctions in which a large proportion of pectin is present. We employ alcoholic tinctures or extracts in which practically no pectin is present. Besides, these resins and pectins have no action on the heart itself. It must not be inferred from this that I advocate decoctions of *Cereus* and *Opuntia*. Although useful in dropsies, they are no more efficacious than the demulcent drinks known to us, such as barley water, gruels, and others, which we are in the habit of employing as aids in the treatment of dropsies. They are aids, nothing more. We use what lies to our hand, and the West India Islanders do the same.

I have so many people to thank for help in my work on these drugs that I hardly know where to begin; but I must not forget to mention Mr. J. H. Hoseason, late Lecturer on Pharmacy in the Owens College; Mr. E. M. Holmes; Messrs. Parke, Davis & Co.; Burroughs, Wellcome & Co.; Evans, Gadd & Co.; Wyatt (Lancaster), and others.

The *chrome-ore* industry in California, which for many years has been the only domestic source of supply, became practically defunct in 1897. The total production of the State is estimated at 50 tons, and the general opinion is that the industry has no future.

GLEANINGS FROM THE MEDICAL JOURNALS.

BY CLEMENT B. LOWE, M.D.

EXPERENTIA FALLAX.

Under the above title a very interesting article by H. D. Didama, M.D., is published in the *Philad. Med. Jour.*, January 15, 1898. The author rapidly and forcibly sketches the rise and reign of bleeding as an almost universal remedy. In speaking of the sway which it exercised over the most eminent practitioners of the age he says: "The truth is, these eminent men had never tested—never dared to test—any other form of treatment. They had walked so long in the good old road that their honest inertia could only be overcome by the "brute force," as Virchow expresses it, of indisputable facts ascertained by repeated control-experiments. These facts having been furnished and submitted to a successful cross-examination, the gyves of the venerated experience were broken, and the illustrious captives frankly abandoned their prejudice, sheathed their lancets, and led their disciples into the new and bloodless pathway."

* * * * *

A voluminous library would be required to contain the quotations which might be made from books, ancient and modern, showing that a great multitude of wise and illustrious medical authorities and their faithful disciples, from the dawn of history, have regarded alcohol, if not a panacea, certainly an indispensable help in the management of many or most diseases. And this unanimity of opinion and assurance of faith was founded on the inerrant testimony of experience. Indeed the large majority of eminent medical authorities and teachers still advocate the use of alcohol as the best of all stimulants, and appeal to their own clinical observations as ample justification of their practice. The less eminent members of the profession, the compilers of books, and the busy practitioners simply follow their leaders without investigation and without question.

* * * * *

Regarding the action of alcohol and its value in the treatment of disease, a great diversity of opinion exists in the profession. Many eminent physicians, and the number seems to be increasing here and abroad, from careful study and experiment, and from a prolonged disuse of the drug as a beverage or a medicine, have

arrived at the conclusion that alcohol is a depressant rather than a stimulant; that it is not a food; that its power to check the metabolism of tissues, and delay the excretion of effete products from the system, is not a benefit; that it does not promote digestion, but retards it; that it is the cause of many diseased conditions; that the substitution of other drugs, in cases in which alcohol is claimed to be beneficial, is productive of better results; and that there can be no reasonable doubt that the daily use of alcohol by members of the community, as a beverage, or as a remedy, with all its possible and actual evils, is in many instances, *the outcome of the well intended prescriptions of family doctors.*

* * * * *

Now, if it should turn out that the use of alcohol, besides being hazardous, is always unnecessary, such cardiac, cerebral and other stimulants as strychnine, strophanthus, digitalis, ammonia, caffeine and nitroglycerin being able to fulfil all demands for which alcohol has been administered, what a load of responsibility will rest on the text-books, the very latest of which inculcate, with increased vehemence, a doctrine which may do immeasurable personal injury to the great host of medical graduates sent out every year, and to the trusting communities which expect and deserve from their medical attendants wise benefactions unmixed with baneful ingredients!

* * * * *

If the medical journals of the country, instead of advertising and commending medicated wines, intoxicating malt extracts and well-aged whiskies, would intimate that the non-alcoholic treatment of diseases deserves a fair trial, and, if their readers would personally test this treatment, no harm, but an immense amount of good, might be the outcome.

TREATMENT OF SOFT CHANCRE.

A Hungarian practitioner, Dr. E. Szanto, has come to the conclusion that, of all the means employed against soft chancre, salicylic acid is the best. He uses it in the form of an ointment, as follows:

R Acid. Salicylic, gr. xv
 Vaseline, $\overline{3}$ i
 Tinct. Benzoin, $\overline{5}$ ss

m. — Sig.: For external use. — *Buffalo Med. and Surg. Journal.*

"A GOOD JOKE ON THE DOCTOR."

In Philadelphia, recently, an old morphinomaniac, who for many years had been accustomed to take about twenty grains of morphine a day, called upon the principal physician of the neighborhood, and, for the symptom complained of, was given a prescription for the one-twenty-fourth of a grain of morphine. For a month or more the old man has been showing everybody the prescription, and has had unlimited amusement over the doctor's hasty diagnosis and routine treatment.—*Philada. Med. Journal*, January 8, 1898.

HYDRASTIS AND VIBURNUM IN THE TREATMENT OF DYSMENORRHEA.

The following formula is given in the *Journal de Médecine de Paris* for January 2d:

R Tinct. Hydrastis Canad.,
" Viburnum Prunifolium, } equal parts.

m. —Ten drops to be taken every two hours.

STRYCHNINE IN CHLOROFORM POISONING.

In a desperate case of voluntary poisoning with chloroform, after the failure of all other means, the patient was restored by injecting, several times, about 3 centigrammes of strychnine, seconded by artificial respiration and electricity. No deleterious effects were noted.—*Semaine Med.*, December 15, 1897.

FOR CHAPPED HANDS.

R Menthol, gr. xxiv
Salol, } āā gr. xlv
Ol. Olive, }
Lanolin, 3̄ iii

m. —Sig. : Apply to the hands twice daily.—*Med. News*, Dec. 25, 1898.

X-RAYS IN MILITARY SURGERY.

The Roentgen rays are being employed with great success in cases of gunshot wounds among the British troops in India, in locating splinters of lead, which would otherwise escape detection, as well as fractures and splinters of bone.—*Med. News*, January 1, 1898.

THE USE OF SCOPOLAMINE AMONG THE INSANE.

Dr. S. Tomasini has employed the hydrobromate and sulphate with equal results. They are injected subcutaneously in dose of from $\frac{1}{250}$ gr. to $\frac{1}{84}$ gr. Sleep was readily induced, especially in women, in from two to three minutes. The injections are not pain-

ful, nor do they give rise to local reaction nor to general excitation. The pulse is regular, but more frequent.

There is marked dilatation of the pupils; the sleep is quiet, resembling the physiologic. There are no disturbances nor unpleasant symptoms, as nausea. In maniacal cases and periodic insanity, it is a remarkable sedative. Habituation is easily obtained, and the dose must be rapidly increased.—*Riforma Medica*.

FILTRATION OF MILK.

In several European cities sand filtration of milk is employed at a central depot after its arrival from the country. The filters consist of large cylindrical vessels, divided by horizontal superposed compartments, of which the middle three are filled with fine clean sand, sifted into three sizes, the coarsest being placed in the lowest and the finest in the topmost of the three compartments.

The milk enters the lowest compartment through a pipe under gravitation pressure, and, after having traversed the layers of sand from below upward, is carried by an overflow to a cooler fed with ice water, whence it passes into a cistern, from which it is directly drawn into locked cans for distribution. Milk thus treated is not only freed from dirt, but the number of bacteria is reduced to about one-third. In new milk the loss of fat is said to be very slight, but the quantity of mucus and slimy matter retained in the sand is surprising. The sand is renewed each time the filter is used.—*Medical News*, January 8, 1898.

THE REMOVAL OF WARTS.

Warts can be removed painlessly, and with the avoidance of scars, by applying a supersaturated solution of potassium bichromate once daily.—*Med. News*, Jan. 8, 1898.

AN OINTMENT FOR MUMPS.

R	Ichthyol,	} āā	gr. xlviij
	Plumbi Iodi.,		
	Ammon. Chloridi,		gr. xxx
	Vaselin,		̄i

℞.—Ft. ungt. Sig.: Apply with friction over swollen glands three times daily.—*Med. News*, January 22, 1898.

ADDITIONS TO THE BRITISH PHARMACOPŒIA.

The Medical Chronicle, Manchester, England, December, 1898, contains a very interesting article by Dr. A. T. Wilkinson, which is

commended to the revisers of our own pharmacopœia. Among other things, he says: "It is of no use shutting our eyes to the fact that modern manufacturing chemists and patent medicine vendors are beginning to revolutionize the methods of preserving and administering drugs. Years ago homeopathy was really a revolt against the over-physicking habits of our forefathers, and it has been sustained much more by its practice than by its principle. Though most of us believe that in strict homeopathy there is but little left but the "*suaviter in modo*," we may nevertheless learn a lesson therefrom. We all feel that it is our duty to present our medicines to our patients, and especially to children, in the least objectionable form. The time has gone by when the administration of medicine was considered wholesome discipline.

* * * * *

You cannot present a 5-grain "B. P." pill of carbonate of iron to a young child, but at four years of age one of my own children enjoys 10-grain vanilla jelloids, and greatly benefits thereby. Why is the so-called Tamar Indien so largely sold in spite of its price? Because even the baby of the house will ask for it as "goody," and, like the toffee of a lady friend of mine, that is made with castor oil instead of butter, the box has to be kept out of the way for fear of disastrous results. Now, gentlemen, if we are not to prescribe proprietary medicines, it must be possible for us from the "B. P." to present the drugs to our patients in an equally palatable form.

* * * * *

The globules, tabloids, jelloids, palatinoids, capsules and what not at present in the market, suggest ways by which the older preparations might be supplemented or supplanted. We could also do with an innocent, well-flavored, soft, or, at any rate, easily masticated lozenge, with which any prescribed drug could be incorporated.

Indeed, although the present method of indicating by special preparations in what form drugs are most advantageously dispensed be adhered to, it would not be amiss to supply, in the "B. P.," formulæ for each of the elementary preparations in which the excipients alone are included. This would leave the prescriber absolutely free in his choice of the active ingredients, and thus enable him to keep to the "B. P." whilst avoiding the everlasting mixture and pills.

RECENT LITERATURE RELATING TO PHARMACY.

EXTRACTION OF GUTTA PERCHA FROM LEAVES.

An account of this industry as it is carried on at the Straits Settlement, India, is given in the issue of *Kew Bulletin* for May and June, 1897. The leaves are imported dry in sacks from Borneo and Johore. The trees are overcut in Singapore, and it is reported that there are no more leaves left. The leaves and twigs cost \$4.50 a picul (133 pounds). They are put, damped with hot water, into a rolling machine, two rollers working against each other, which grind them to powder. The powder is thrown into tanks and shaken about. The gutta percha floats in the form of a green, mealy-looking stuff. It is lifted out by fine copper gauze nets, put in warm water and pressed into moulds. It is said to be a very curious little manufactory. It is thought that, on account of the difficulty of procuring leaves, the trade will sooner or later stop.

THE PREPARATION OF PURE IODINE.

Bevan Lean and W. H. Whatmough (*Chemical News*, Vol. 77, No. 1993) state that iodine is most conveniently prepared from cuprous iodide by heating it in a stream of dry air at 220° to 240° and condensing the vapors upon a cold surface. Although the greater portion of the iodine is quickly expelled from the copper salt, it is not easy to expel the whole. After heating 1.7101 grammes at 400° for eighteen hours, 0.15 per cent. of the iodide was still undecomposed. The authors proved that the action of air upon cuprous iodide is not dependent upon the presence of moisture. This they did by sealing cuprous iodide in glass tubes in the presence of phosphoric anhydride.

The iodine obtained at 240° , as described above, leaves no residue when volatilized at 75° . Neither does an examination with the spectroscope give any evidence of the presence of copper. The melting point (uncorrected) is 112.5° to 114° .

The authors have also discovered that cuprous iodide can be prepared by sprinkling iodoform in small quantities at a time upon a hot surface of copper, the product being free from bromide or chloride.

A NEW SYNTHESIS OF GLYCERIN.

O. Piloty (*Berichte*, xxx, 3161) reports a new synthesis of glycerin, which result is not only a matter of technical interest, but is also

extremely interesting on account of the analogy which it bears to the generally accepted theory of the formation of sugars in plants.

By treating the oxime of dihydroxyacetone ($\text{CH}_2\text{OH}\cdot\text{C}\cdot\text{N}\cdot\text{OH}\cdot\text{CH}_2\text{OH}$), which can be prepared by the action of formaldehyde on nitromethane, with bromine, nitrous oxide is given off and dihydroxyacetone remains as one of the products. This compound ($\text{CH}_2\text{OH}\cdot\text{CO}\cdot\text{CH}_2\text{OH}$) is the simplest member of the group of sugars known as ketoses, and heretofore has been prepared only in a more or less impure condition by the oxidation of glycerin. The pure substance possesses the well-known characteristics of the sugars, and with phenylhydrazine forms an osazone. By reduction it is converted into glycerin, and thus the last step in a new synthesis of the latter compound is effected. By many writers formaldehyde is thought to be one of the first products formed in plants by the assimilation of carbon dioxide, and that the sugars are ultimately built up through its condensation.

BUTTER AND TALLOW TREE OF SIERRA LEONE (*PENTADESMA BUTYR-
ACEA*, DON).

Kew Bulletin, in a recent issue, published some interesting information relating to an investigation into the probable value of the seeds of this tree as a source of oil. But, owing to the depressed condition of the market for oil-seeds, the result is not very promising. The tree is described as follows: This noble tree of West Africa is a member of the Gamboge order (*Guttiferae*). It extends from Sierra Leone southward to the mouths of the Niger, and beyond to the equator. It sometimes attains a height of 70 feet; the large glossy leaves are from 5 to 10 inches long, the flowers are abundant, very handsome, and succeeded by a large, lemon-shaped brown berry, 6 inches long and 4 to 5 inches in diameter, with one or two, or sometimes numerous, seeds. The plant was described by Sabine in the *Transactions of the Horticultural Society* (Vol. V, 1824, p. 457) as the "Butter and Tallow tree." It has recently been figured in *Hooker's Icones Plantarum*, pl. 2465 (1896), with a description by Professor Oliver. It is known in Sierra Leone as the "Kamoot" tree. Prof. E. Heckel, in his monograph, *Les Kolas Africains*, refers to it as the "Kanya" tree, and the oil or butter yielded by the seeds as *beurre de Kanya*.

It is also said that the oil is highly esteemed by the natives of the

interior, and that it is preferred by some of them to palm oil on account of its better flavor. The oil is extracted by drying the seeds and parching them over a fire. They are then pounded in a mortar; water is added and the whole boiled and the fat or oil skimmed off as it rises. Recent analysis shows the seeds to contain 41 per cent. of oil, which appears best adapted for soap making.

PREPARATION OF ABSOLUTE ALCOHOL BY THE USE OF CALCIUM CARBIDE.

M. P. Yvon (*Comptes Rendus*, cxxv, No. 26) has found that when coarsely-powdered calcium carbide is brought into contact with alcohol (90 to 95 per cent.), evolution of acetylene gas takes place and continues as long as any water remains in the alcohol.

This reaction, therefore, affords a very simple means of determining whether an alcohol is anhydrous. In order to test a sample, a few cubic centimeters of the alcohol are put into a test-tube and a few grains of the coarsely-powdered carbide are added. If no water is present, no gas-bubbles appear, and, on shaking, the liquid remains clear. But if the mixture contains even traces of water, small gas-bubbles form, and, on shaking, the mixture becomes cloudy, owing to the formation of calcium hydrate.

To prepare absolute alcohol, a quantity of 90 or 95 per cent. alcohol is placed in a flask with one-fourth its weight of calcium carbide, coarsely powdered. The reaction is allowed to proceed a few minutes, or until it becomes less vigorous, and then the flask is shaken frequently during two or three hours, after which it is allowed to stand for twelve hours. The flask is again shaken, and, if necessary, a little more of the carbide is added. The mixture is then distilled. The first portions of the distillate contain some acetylene in solution, and are collected in a separate vessel. The distillate afterward collected constitutes the product desired.

A more satisfactory method consists in collecting all the distillate in one vessel and adding to it a small quantity of dried copper sulphate. This latter takes up the acetylene present, and the product formed need not be separated before a second distillation is carried out.

PURE CALCIUM GLYCEROPHOSPHATE.

Continuing their experiments on the glycerophosphates, Adrian and Trillat propose the following method for preparing the pure

calcium salt: Equal parts of glycerin and phosphoric acid are gradually heated on a sand-bath in an enamelled vessel to 130° and 150° C., and maintained at that temperature for twenty-four hours, when the dark-colored viscid mass begins to evolve acrid fumes. Instead of calcium carbonate, the authors use tribasic calcium phosphate to combine the free phosphoric acid, since effervescence is thus avoided. The free phosphoric acid forms with this dibasic calcium phosphate; milk of lime is then added in excess, which combines with the glycerophosphoric acid and again precipitates the phosphoric acid as tribasic calcium phosphate, which is filtered out and again used in subsequent operations. The filtrate is concentrated to a pasty consistence, then poured into 10 parts of alcohol, and boiled for an hour. After draining it is again treated with alcohol and precipitated by heating, collected, and dried on the water-bath. The authors have obtained the salt in the form of a micro-crystalline powder by precipitating the aqueous solution by boiling, when it forms minute, well-formed needles. These, however, at once lose their crystalline form on exposure to the air, and disintegrate even on the microscope slide while under observation. Analysis of the salt gave figures corresponding to the anhydrous salt of Pelouse, and did not support the statement of Portes and Prunier that it contains two molecules of water. The solubility of the glycerophosphate in water at 25° C. was found to be 4.53 in 100.—*Four. de Pharm.* (6), vi, 481, through *Pharmaceutical Journal*, January 29, 1898.

HOW THE BANANA IS GROWN.

In the February number of *The Cosmopolitan* appears an article on the above subject, by Frederick S. Lyman, from which we select the following as of interest to our readers:

Before Revolutionary times Cuba shipped many hundred thousands of bunches a year to northern markets, and will yet do so again; and Jamaica has in the three parishes of Portland, St. Mary and St. Thomas 1,500 acres under cultivation. But the land of the banana *par excellence* is Costa Rica. From Costa Rica come the best and largest bananas that are sold in the New York and New Orleans markets, the bunches weighing from 25 to 100 pounds each. In 1896 about 2,000,000 bunches were shipped from Port Limon, and the number for 1897 must have reached 3,000,000.

The most famous banana district in Costa Rica is that of Matina.

Once or twice a year the Matina River overflows its banks, bringing down with it a vast amount of silt, which it distributes over the low-lying lands to the depth of several inches. This silt is a fertilizer of the richest kind. In this district banana trees often reach a height of 35 feet, a height rarely attained by this species elsewhere.

When a piece of forest land is to be planted in bananas, a gang of laborers is first set to clearing away the underbrush—no easy task in such a clime. Then with a long rope are measured off rows six yards apart to be planted with "bits," cuttings from the banana root. At every six yards in the length of rope is tied a piece of red tape, and at every piece of tape a stake is driven into the ground to mark the holes to be dug for the "bits." The "bits" once planted, the men are put to work with axes to cut down the trees.

In six months' time the banana rows must be cleaned; in ten months all the weeds have to be cut down, and in twelve months from the time of planting the first crop or "cutting" is obtained.

On rich land the trees produce fruit the year round and keep on bearing from thirty to forty years, and will yield 400 bunches a year per acre.

The planters receive from 15 to 30 cents a bunch for the banana fruit, according to the size, and it is interesting to contrast these prices with the price in New York, where, within a week's time, a 30-cent bunch will likely retail for \$10. But, in making this comparison, it must be remembered that the planter runs very little risk, his crop being sure and steady, whereas the shipper occasionally meets with severe losses.

Botanists assert that the banana is not a native of Central America and the West Indies, but that it has been imported from the tropical lands of the East. But, as the author observes, it seems to thrive better in its new home than in its native soil.

The varieties of bananas cultivated in Costa Rica are as numerous as the varieties of apples in northern climes. While the red-skinned bananas are considered the superior in the New York market, the yellow-skinned are much the more common, as, being less juicy, they stand the trip better and do not decay so quickly.

The best authorities now agree that there is no specific difference between the banana and plantain, and that the names are frequently interchanged.

While in Costa Rica the fruit is used extensively for food, it is by

no means the main dependence of the natives, as it is on many islands in the Pacific. A useful and nutritious flour is extensively made by grinding the unripe fruit after it has been dried in the sun.

Analysis shows that this banana flour contains a very large quantity of starch, an average of more than 71 per cent. having been found. This element, which is so prominent in the immature fruit, changes into sugar as the fruit ripens, and gives the banana its sweetish taste.

CINCHONA.

The quantity of quinine in the cinchona-bark offered at the ten Amsterdam auctions of 1897 fell considerably below that offered in 1896, and would, indeed, have carried us back to the figures for 1895 but for the huge supplies offered at the December sales. Weight for weight, the supplies of bark actually fell below those for 1895 as well as of 1896, but it is too often forgotten, in speculating upon the future of the bark-supply, that while the output of the Island of Java is falling, the alkaloidal richness of the bark continues to rise. Thus, the average richness (in quinine) of the Java manufacturing bark in 1897 shows an increase of nearly 5 per cent. on that of the year before, and of over 43 per cent. since 1889. The actual average unit for each year, and its percentage increase upon its predecessor during the past seven years are shown in the subjoined table:

	1891.	1892.	1893.	1894.	1895.	1896.	1897.
Average unit per cent.	4.08	4.50	4.60	4.93	5.01	5.48	5.73
Per cent. increase on the year before	2	10	2	7	2	9	5

From the bottom line it will be noticed that the average unit has generally taken a big step forward every second year. If this tendency be maintained in the same ratio during the twelve-month just commenced, the average quinine-content of the manufacturing bark offered at Amsterdam this year will be over 6 per cent. Hitherto such a unit has only been attained in the auctions of August and September, 1897, and a few years ago it would have been looked upon as wildly improbable.

The "syndicate"—if we may call it by that name—of Java planters and Amsterdam brokers that has undertaken the task of raising the unit-price by concerted action during a preliminary period of three months commenced its operations at the auctions of

Thursday last. It only succeeded in preventing the bark from falling below an average unit of 6.90c. per half-kilo., which is certainly a Pyrrhic victory. It may be urged that, without the stand made by the "syndicate," the unit would have been down to 4 or 4½c. per half-kilo., and every advantage lost that was gained during the autumn. Still, if the planters cannot do better in February and March than they did last Thursday, their co-operation will probably not outlive the initial three months, and the last state of the planting interest will be worse than the first, for the decisive defeat of a "syndicate" that started under such favorable auspices as the present will probably deter others from trying the policy of concerted action afresh. We have often expressed the belief, to which we still adhere, that the Java planters could have obtained effective control of the bark-market if they had known how to seize the right moment, and had had the right man to lead them. But we are afraid that that time is now gone for good, and so far we have seen no evidence of the existence of a man qualified to fight the quinine combination successfully. This does not imply that we take a gloomy view of the quinine market—far from it—but we do incline to the belief that the planters will shortly fall more helpless victims to the quinine "combination" than they have ever been before. The quinine-makers are a small but highly-organized body, the planters a mere undisciplined mob. It seems, indeed, from the sale catalogue of the last Amsterdam auction, that the firms who took a leading part in the December conferences that led to the scheme for concerted action did withdraw the bulk of their cinchona at prices above the unit obtainable at the auctions, but there appear to be plenty of others only too ready to take the places of those who refuse to sell. And yet there are many factors which would make a combination of cinchona-planters more easy to manage than many another syndicate that has for years held its own in the face of adverse circumstances. For one thing, 85 per cent. of the available quinine-supply of the world is produced in one island, and by less than 100 firms. Next, it is highly probable that the bulk of the great factories have not more than a moderate stock of bark on hand, and that there is no excessive cinchona stock in second hands to harass the action of a combination. Further, a bark combination would be free from the great trouble of other syndicates in raw products that new supplies may be discovered at any moment. It

takes time for new cinchona plantations to come into bearing, and no danger could threaten from South America, unless the price were raised exorbitantly.

With regard to the quinine factory which the combined German makers are said to contemplate establishing in Java, at Pengalengan, the promoters of the undertaking in Java have published a statement to the effect that the projected factory is entirely "national" (*i. e.*, Dutch), and that neither German nor English manufacturers are concerned in it. We believe that this is only technically correct, and that, in fact, the promoters of the Pengalengan works are connected with the Amsterdam quinine works, which, in turn, are closely allied with the firm of Böhringer & Sons, of Manheim.—*The Chemist and Druggist*, January 29, 1898.

The Philadelphia Museums.—These museums had their origin in the successful movement to secure the vast exhibits of natural products from the numerous countries represented at the Chicago exhibition of 1893. These exhibits were presented to the municipality of Philadelphia, who have devoted a large sum of money to their proper installation. In addition to the exhibition there is the scientific and commercial library, with its free reading-room, where may be found a large number of statistical and scientific works, valuable to both producers and consumers. A laboratory has also been started as an adjunct of the scientific department of the Philadelphia Commercial Museum, its main object being the examination and analysis of raw materials and manufactured products. The system of this laboratory, which is free to all, will conform closely to that in use in England and on the Continent, and all tests will be made independently in duplicate by two observers, thus insuring a high standard of accuracy.

Cinchona in India.—Mr. J. E. O'Connor, Director-General of Statistics for India, states in his report for the official year 1896-97 that there were 5,916 acres of land under cinchona cultivation, of which about 72 per cent. was situated in Southern India, the remainder being in Bengal. The area in Bengal, comprising 1,636 acres, lies in and near Darjeeling. In Southern India there are 1,762 acres, in the Nilgiris; 731 in Malabar, 1,402 acres in Travancore, 335 acres in Mysore, 8 in Coorg, and 42 in Madura. In Bengal the land under cinchona was, in the main, planted and is maintained by Government, the plantations of the State covering 1,556 acres, but in the Madras Presidency the industry is largely in private hands, the State plantations covering under 800 acres. During the twelve years ending 1896-97 the area under cinchona has fallen from 10,418 acres to 5,916 acres. There has been a substantial decline in Bengal, as well as in Madras, and in Coorg the cultivation has been almost entirely abandoned.—*The Chemist and Druggist*, January 29, 1898.

EDITORIAL.

LIQUEFIED AIR.

The liquefaction of air can scarcely be considered new, but the production of liquid air has only recently been accomplished in this country on a commercial scale. This fact was made public through the daily papers only a few weeks ago, and, consequently, has not yet appeared to any extent in the scientific journals. A quantity of the liquid, $2\frac{1}{2}$ gallons, was brought from New York to Philadelphia in a milk-can without any special precautions. In its normal condition, air, as we know it, is a gas, just as, in its normal condition, water is a liquid; but if we lower the temperature of the air or increase the pressure on it, or both, to a sufficient degree, we reach a point at which condensation takes place. The liquefaction-point of air under normal atmospheric pressure is -191°C .

A process for the commercial manufacture of liquid air was described in 1895 (*Journal of the Society of Chemical Industry*, Vol. 14, page 984), but the results do not appear to have been on a very large scale. In the present instance the successful production of liquid air is claimed by Mr. Charles E. Tripler, of New York. His process is based upon the well-known fact that if a gas be compressed and then allowed suddenly to expand, it absorbs the heat of the surrounding medium, thereby producing intense cold.

According to this method, air is subjected to a pressure of 2,000 pounds to the square inch, passed through a coil and permitted to issue from a needle-point orifice. There it expands and cools. This cold stream of air circulates around a second coil through which compressed air is flowing, reducing the temperature of the latter. The air issuing from this second coil has its temperature lowered to a point due to its own expansion, plus the cold imparted from the first expansion. The expanded and extremely cold air from the second coil is used similarly to cool a third coil, the air in which is brought down to a temperature of -191°C . and below, at which it condenses and flows from the end of the coil in a liquid stream.

It is of interest to note some of the properties of this new product. Tin placed in the liquid causes it to boil, the tin becoming brittle as glass. Copper and platinum are not so affected, hence it is believed that these metals will make suitable containers for the liquid. When heat is applied to it, it boils, as would naturally be supposed, with excessive ebullition; but when water is poured into the boiling liquid the water is instantly frozen. Alcohol and mercury are likewise frozen when brought in contact with the liquid.

Whatever may be the economic applications of this interesting product, it is pretty certain to play an important part in laboratory experimental work. Attention was called to the fact, in 1895, that when the liquid was boiled the nitrogen was vaporized first, so that the latter portions consisted of nearly pure oxygen. It was then shown that oxygen could be prepared by mechanical means. Other uses for this liquid will, no doubt, rapidly suggest themselves.

Especially does it seem probable that it will become one of the most economical means of producing artificial cold. Since mechanical means only is necessary for its production, it ought to become very cheap, and at the same time it will be free from the dangerous character of liquid ammonia.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

FORMULAIRE DES MÉDICAMENTS NOUVEAUX. Par H. Bocquillon-Limousin, ninth edition. Librairie J. B. Baillière et Fils, Paris, 1898.

Each year this publication increases in size and value. The most notable additions of the present edition are: Cacodylic acid, Cardol, Chelidonine, Chinaphthol, Chrysoïdine, Cryophine, Eucaïne, Holocaïne, Hydrogyraseptol, Ichtyalbine, Mydrol, Orthoform, Péronine, Phenylpilocarpine, Picronitric acid, Pyramidon, Spinol, Tannalbine, Tannosal, Triphénine. There have also been added a number of plants new in therapeutics, which have been introduced from the French colonies and other foreign sources. A large number of formulas for the pharmaceutical preparations of the new drugs are scattered through the work. It is a book which will be found useful by the pharmacists of every nationality.

OBSERVATIONS ON RECENT CASES OF MUSHROOM POISONING IN THE DISTRICT OF COLUMBIA. By Frederick V. Coville. Department of Agriculture, Circular No. 13. Revised edition. Washington, D. C., January 4, 1898.

The present revision of this timely bulletin is in keeping with the demands for information on such an important and interesting subject. Several new cuts have been added and the text increased by nearly three pages, thus making a circular of twenty-four pages.

CALENDAR OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, 1898. As is usual, this Calendar contains an account of the educational and benevolent work of the Society, and also much information useful to pharmacists and chemists.

PROCEEDINGS OF THE NEW HAMPSHIRE PHARMACEUTICAL ASSOCIATION, with the Report of the Commissioners of Pharmacy.

At the Twenty-fourth Annual Meeting held at Manchester, N. H., September 7 and 8, 1897, two papers were presented by Dr. Charles Tufts, entitled respectively, "The Word Apothecary" and "Preliminary Education for an Apothecary."

PROCEEDINGS OF THE TWENTIETH ANNUAL MEETING OF THE KENTUCKY PHARMACEUTICAL ASSOCIATION, held at Crittenden Springs, Ky., June 15-17, 1897.

At this meeting papers were presented as follows: "A Business Remedy," by O. C. Dilly; "The Druggist as a Merchant," by Vernon Driskell, and "A Posse ad Esse—The Remedy," by G. A. Zwick.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 15, 1898.

The regular Pharmaceutical Meeting was held in the Materia Medica Lecture Room, with Dr. C. B. Lowe in the chair. The minutes of the previous meeting were allowed to stand as published.

The meeting was unusually well attended, and proved to be one of the most interesting of the present series.

The Registrar presented, in behalf of Messrs. McIlvaine Bros., Philadelphia,

the following: Samples of metallic antimony and antimony ore and specimens of white, or purging, Agaric, and *Scopola japonica*, the latter being said to be used to a considerable extent in the manufacture of belladonna plasters, on account of the atropine which it contains.

The first speaker introduced was Mr. Jokichi Takamine, now of Detroit, but formerly a resident of Japan, who presented, in a very pleasing manner, an address on the subject of "Diastatic Fungi and their Utilization" (see page 137).

Before taking up the subject proper of his address, Mr. Takamine said, in reply to the remarks of the chairman on the rapid advancement of the Japanese in the arts and sciences, that what his country had accomplished in recent years was due to American enterprise. Other countries had been opened at the cannon's mouth, but, through the treaty negotiated by Commodore Perry, the eyes and hearts of the Japanese people had been opened, and, as a result, a great impulse given to the study of the applied sciences. Through the influence of physicians, the study of medicine was the first to be undertaken by them, and to-day the majority, or at least half, of the members of the governmental cabinet of Japan are members of the medical profession.

In discussing the relative action of diastatic substances, Mr. Takamine advanced some interesting theories in explanation thereof. He said that all cereals possess certain diastatic power. This he had verified experimentally. According to his theories, Taka-diastase, or the diastase produced by fungi, is composed of one starch-saccharifying unit in proportion to three starch-liquefying units, while cereals contain only starch-saccharifying units, which do not have full starch-converting action, until combined with starch-liquefying diastase, when the combined potency is increased. Malt was represented as containing an equal proportion of these two kinds of starch-converting units.

Accompanying the address were micro-photographs of both diastatic and non-diastatic fungi, and photographs and sectional drawings of the buildings used by Messrs. Parke, Davis & Co. in the production of diastase from fungi, these all being exhibited by means of the electric lantern.

In the general discussion which followed, Mr. J. W. England wished to know what tests are used for Taka-diastase and what advantages it has over malt in the treatment of amylolytic dyspepsia. The answer as given by Mr. Takamine to the first query is embodied in the article on page 141.

The advantageous qualities claimed for Taka-diastase by him were stability, and freedom from sugars. He said that malt is a nutrient of itself, but that in dyspeptic troubles attended by fermentation the sugars present in malt have a tendency to aggravate the trouble.

In answer to a question by Professor Remington on the stability of Taka-diastase in solution, Mr. Takamine said that it does not lose its diastatic activity at a temperature of 65° C., but at 75° C. it is completely destroyed.

Others taking part in the discussion were the chairman, Prof. S. P. Sadtler, Dr. A. W. Miller and Mr. L. F. Kebler.

A hearty vote of thanks was tendered Mr. Takamine for his excellent address.

The next speaker on the programme was Prof. Henry Trimble, who contributed a paper on "An Exudation from *Larix Occidentalis*" (see page 152). A sample of the exudation received from Prof. C. S. Sargent was exhibited.

Two samples of oil of bay were presented by Dr. Miller. He reported that

one of these had been treated in a manner to make the specific gravity conform to the official standard, and that the other was the normal product.

On motion, the meeting adjourned.

THOS. S. WIEGAND,

Registrar.

THE AMERICAN MEDICAL ASSOCIATION.

Section of Materia Medica and Therapeutics.—The following papers and discussions have been promised for the meeting at Denver, Col., June 7-10, 1898:

"Yellow Fever: Its Etiology and Treatment." Discussion by Surgeon-General George M. Sternberg, M.D., of Washington, D. C.; Professor John Guit  ras, M.D., of Philadelphia; Sollace Mitchell, M.D., of Jacksonville, Fla.; T. S. Scales, M.D., of Mobile, Ala.; G. B. Thornton, M.D., of Memphis, Tenn.; H. M. Bracken, M.D., of Minneapolis, Minn.; P. E. Archinard, M.D., of New Orleans, La.

"Aims of Modern Treatment of Tuberculosis." By Professor Edwin Klebs, M.D., of Chicago. Discussion by Charles Denison, M.D., of Denver, Col., C. H. Whitman, M.D., of Los Angeles, Cal.

"Serum Therapy of Tuberculosis." By Prof. S. O. L. Potter, M.D., of San Francisco, Cal. Discussion by Professor James M. Anders, M.D., of Philadelphia.

"The Therapeutics of Pulmonary Phthisis." By Paul Paquin, M.D., of St. Louis, Mo.

"Tuberculin as a Diagnostic and Curative Agent, with Report of 250 Tubercular Cases Treated." By C. H. Whitman, M.D., of Los Angeles, Cal.

"The Practical Value of Artificial Serum in Medical Cases." By P. C. Remondino, M.D., of San Diego, Cal.

"The Use of Remedies in Diseases of the Heart and Blood-vessels." By T. Lauder Brunton, M.D., D.Sc., F.R.S., London, England.

"The Mescal Button." By Prof. D. W. Prentiss, M.D., of Washington, D. C.

"The Modern Intestinal Antiseptics and Astringents." By William Frankhauser, M.D., of New York.

"To What Extent is Typhoid Fever Favorably Modified in Its Course, Duration, Termination or Sequel   by the Administration of Drugs?" By Frank Woodbury, M.D., of Philadelphia, Pa.

"Strychnine." By J. N. Upshur, M.D., of Richmond, Va.

"Methods of Teaching Materia Medica and Therapeutics." By Prof. G. H. Roh  , M.D., of Baltimore.

"The Study of Materia Medica and Therapeutics." By H. M. Bracken, M.D., of Minneapolis, Minn.

"The Great Therapeutic Importance of a Rational Adaptation of Cathartic Remedies to the Physiological Functions of the Gastro-intestinal System." By E. D. McDaniels, M.D., LL.D., of Mobile, Ala.

"Why the Pharmacopoeial Preparations Should be Prescribed and Used by the Profession." By Leon L. Solomon, M.D., of Louisville, Ky.

"The Use of Electricity by the General Practitioner." By Caleb Brown, M.D., of Sac City, Ia.

The following have also promised papers, subjects to be announced very soon, together with the day assigned for each discussion and paper:

Dr. J. E. Atkinson, of Baltimore, Md.; Dr. Henry Beates, of Philadelphia, Pa.; Dr. T. M. Balliet, of Philadelphia, Pa.; Dr. George F. Butler, of Chicago, Ill.; Dr. Dudley W. Buxton, of London, Eng.; Dr. J. Solis-Cohen, of Philadelphia, Pa.; Dr. N. S. Davis, Jr., of Chicago, Ill.; Dr. P. J. Farnsworth, of Clinton, Ill.; Dr. J. E. Moses, of Kansas City, Mo.; Professor Joseph P. Remington, of Philadelphia, Pa.; Prof. L. E. Sayre, of Lawrence, Kan.; Dr. H. V. Sweringen, of Fort Wayne, Ind.; Dr. E. L. Stephens, of Fort Worth, Tex.

The chairman will be pleased to receive and place upon the programme subjects for discussion and papers. John V. Shoemaker, M.D., Chairman, 1519 Walnut Street, Philadelphia, Pa.

NOTES AND NEWS.

The Monthly Cyclopædia of Practical Medicine will replace the *Universal Medical Journal*. The editor is Dr. C. E. de M. Sajous, and in the first number he considers the "Treatment of Cancer" editorially, and presents some valuable suggestions.

Die Heilpflanzen der Verschiedenen Völker und Zeiten is the title of a work to appear in parts shortly, by Professor George Dragendorff. This work is sure to mark a distinct forward step in the study of the history, constituents and uses of medicinal plants.

The Fifth International Congress of Hydrology, Climatology and Geology will meet at Liege, Belgium, from September 25 to October 1, 1898. The General Secretary is Dr. G. Jorissenue, of Liege. The preliminary announcement gives the names of the officers and the rules which shall govern the Fifth Congress.

Pharmaceutical Archives is the title of a new journal to be supplementary to the *Pharmaceutical Review*. Dr. Edward Kremers is editor. This new journal will publish the more technical scientific papers, and the *Review* will aim to publish more abstracted matter. Both journals are under the business management of the Pharmaceutical Review Publishing Company, of Milwaukee, Wis.

Copper Sulphate in the United States.—The production of copper sulphate in the United States in 1897 was 49,000,000 pounds, against 48,732,840 pounds in 1896. The percentage of copper in this material is about 25. The greater part of the production of copper sulphate is made by chemical works in the East, but a good deal is turned out as a by-product by various gold and silver refiners.—*The Journal of the Society of Chemical Industry*, January 31, 1898.

Howards and Sons' supplement to the colossal number of the *Chemist and Druggist* of January 29 is, notwithstanding its advertising features, a dignified contribution of great historical interest. It marks the end of the first century of the firm's existence. The history of quinine is an important feature of the contribution, and it is interesting to note that the manufacture of this chemical was at first (about 1827) considered of such insignificant importance that the exact date when the first few lots were made has been lost, "though a thousand ounces then struck the imagination more than the million and a half ounces contained in the bark offered in one sale in Amsterdam the other day."

Georgia Phosphates.—A preliminary report on a part of the phosphates and marls of the State has just been published by State Geologist W. S. Yates. The report has been prepared by the Assistant State Geologist, S. W. McCallie. The conclusions of the document are as follows: The result of our investigations in the various countries lying along the Georgia-Florida State line demonstrates to a considerable degree of certainty two very important economic facts. First, that there do not exist anywhere along the State line with the exception, probably, of Thomas County, any deposits of phosphate of sufficient extent and purity to be mined with profit for the manufacture of commercial fertilizer at its present market value. Second, that all these counties contain more or less extensive beds of marl, or low-grade phosphate—a valuable natural fertilizer that might be used to a great extent in replacing the more costly manures. There can be little doubt that the deposits of marl are extensive, and equal in many respects the green-sand beds of New Jersey. In only a few instances have they been tried on growing crops, but in all cases they are reported to have produced beneficial results.—*The Journal of the Society of Chemical Industry*, January 31, 1898.

Petroleum in Java.—According to a French Consular Report, there are, in the district of Lidah and Koetei, 40 wells, with an average production of 19,800 gallons of oil, which could easily be increased to 25,000 gallons. Recent reports are to the effect that two new wells have been discovered, producing some 2,400 barrels per day additional. In the district of Panolan there are fifteen wells, the largest of which has a daily production of 2,400 barrels. The wells of Tinawen have been but little exploited. A company has obtained a ten-year concession for this district, and the probable yield is estimated at 1,600 cases a day. There are two refineries, and another in process of construction. The paraffin factory at Ploentoeran, which has a capacity of production of 6,000 pounds a day, is only partially in action. A factory at Wono-kranjo supplies all the oils necessary for the sugar refineries and for the railroads of Java. Statistics for the last eight years show that the production of refined petroleum on this island increased from 8,000 cases in 1889 to 1,250,000 cases in 1896. Java, on account of its geographical position, finds the cost of transportation to the Eastern markets comparatively small.—*The Journal of the Society of Chemical Industry*, January 31, 1898.

OBITUARY.

THOMAS J. HUSBAND.

The venerable druggist, Thomas J. Husband, died at his home, 241 South Eighth Street, this city, on January 21st, in the eighty-fifth year of his age. Mr. Husband was born in Maryland, but came to this city when quite young. He was apprenticed as a druggist, and in 1833 graduated from the Philadelphia College of Pharmacy, his graduating thesis being entitled "Experiments on *Galipea Officinalis*." He early identified himself with the work of the College by becoming a member, and in 1835 was elected a member of its Board of Trustees. Mr. Husband was for many years engaged in the retail drug business at Third and Spruce Streets, but was best known to the drug trade at large as the originator and manufacturer of "Husband's Magnesia."

Mr. Husband belonged to the Society of Friends, and was esteemed for his fine personal qualifications.

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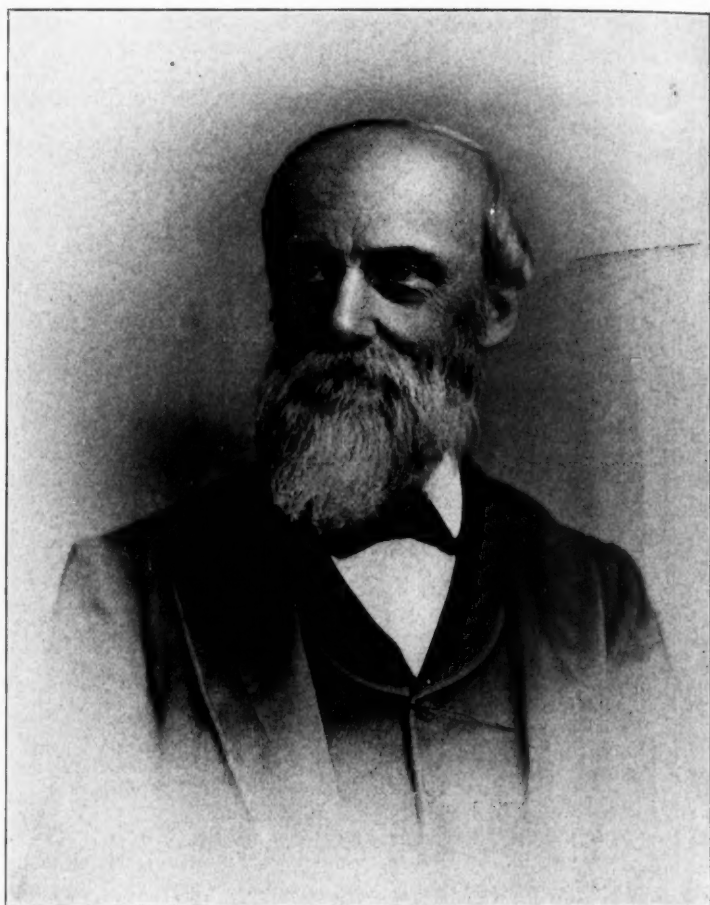
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ALFRED BOWER TAYLOR.